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The Descent of Animals*

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THIS subject, in my opinion, has been given too little attention heretofore, by the practicing veterinarian. It is the stage of evolution and deals particularly with inheritance. The veterinarian and the breeder may extend their observations over a range of generations in a relatively short time, a thing impossible in the observation and study of mankind; it is this that renders the chances for the veterinarian most favorable and assures him of the greatest results.

In a discussion on this subject Doctor Martius[1] of Rostock said: "That from three to four generations of the human require a century for their development, while during the same period 1000 to 1200 generations of rabbits may succeed each other. Therefore, if it be at all possible to create certain varieties, by proper selective breeding, this can be obtained much quicker and easier with domestic animals than with human beings."

The veterinarian undoubtedly should have a deeper insight into the fundamental principles of the science of inheritance, than anyone else. No other vocation, not even that of the practical breeder, has such an abundance of experience at its command as has the practice of veterinary medicine. By the utilization of these opportunities it becomes easier to fathom the laws of inheritance and to acquire rules for their application, and by this even the industry of breeding must gain immensely.

When we contrast the incomplete comprehension of the laws of nature at the beginning of the last century with our knowledge of this subject at the present time, we cannot but be astonished at the immense advancement which thinking man has made in every branch of physical science. Considering the development of the science of physics, viewed from all its angles, it must strike us with awe to observe that man has succeeded in proving the unity of the power of nature throughout the entire universe.[2] Chemistry has familiarized us with a great number of formerly unknown substances, all of which are compounded from but a few elements (about seventy) that hitherto we were unable to analyze, and a part of which are of the greatest practical significance to life. Not even these have proven invincible barriers to the inquiry of man, since in recent times, he has succeeded in breaking up apparently simple elements into other elements less complex.

The patient investigation, observation and study which led to the elaboration of the theory of evolution marked a great advancement and may well be ranked equally with any of the discoveries in the realms of pure science, with the rest. While formerly nature was considered permanent, today she has been proven to have changed and to be ever changing. The living beings are found to be in balance with, in some degree dependent upon, and to react to, her changes. Even thousands of years ago a few thinking investigators spoke

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of the evolution of things; but the thought that the world is nothing but an eternal evolution of substance, is a child of the nineteenth century.

Passing to the consideration of the changes, which all living beings undergo, let us before turning to our real problem take a glimpse at the history of the theory of evolution, which Lamarck in the year of 1809 compared with the older theory of Linne, that all species originated through a specific creation. Jean Lamarck said, that the individual species were united by descent and that the influences of necessity, habit and the exercise of the organs had brought about the change and perfection of the living beings. While Lamarck[3] accepts a fixed development of race, without selective influences (since, according to his theory, such factors as food, employment and habit, change *all* individuals in the same way) Darwin believes, that not *all* individuals are influenced by these named factors, nor in the same manner, nor in equal degree.

We shall occupy ourselves principally with Darwin's theory. It consists of two main parts, each almost independent of the other. The basis of Darwin's theory is the mutation of descent, which as we have related, Lamarck had promulgated in the year of Darwin's birth. The new teaching of the latter consists of an attempt to prove the existence of a certain mechanic development of species.

Darwin, as had also Lamarck, came to the conclusion that the related species could not be other than the descendants of a common primitive form, which had been altered by the influences of nature in adapting them to the varying requirements of diverse habitations and changing conditions. He was not satisfied, however, as to the source of these variations or as to how the living beings were furnished with elements necessary for the appropriate adaptation to their requirements. From these considerations[4] Darwin evolved the theory of selection, the teaching that there is a natural selective breeding. He decided that many more living beings were produced than were able to exist and that those which were best adapted to fulfill the requirements for existence remained alive. He argued that there must arise a contest, that life must be a struggle for existence, out of which, of course, the preferred individuals came off victorious and were thus preserved. Darwin designated this procedure in nature as "natural selective breeding," Spencer as "surviving of the most suitable." It is ordinarily referrred to as "survival of the fittest" and in a spirit of ridicule by its opponents as "survival of the fightest."

According to Darwin's belief, the individuals best fitted for her purposes are chosen by nature, in a manner similar to that by which the breeder chooses favorable characteristics, in that he crosses only choice individuals, by which method the desired characteristics increase more and more and the perfection once obtained becomes extensively inherited. Thus develop new varieties or races. The variability is actually widespread in nature and one may encounter alterations everywhere, which were brought about by changed nutrition, light, moisture, temperature, climate, etc.

Horses, which were imported to the Philippine Islands in 1764, have become smaller, while cattle imported near the same time have increased in size. In New Guinea dogs grow long stiff ears, acquire a fox-like type and even their bark changes in from three to four generations; on the coast of Guinea dogs lose their hair entirely. Weismann, Standfuss and Fischer succeeded in changing butterflies from summer-forms to winter-forms.

The history of domestication has proven to be one of the greatest of experiments, although unconsciously undertaken. The history of our domestic animals dates far back and their races have in part a great age. It is therefore impossible to directly observe the processes and we are in most cases confined to historical hypotheses and experiments in order to explore the family history of the beasts that serve man. It is a settled fact, however, that breeding by natural selection and the varying natural requirements of life, such as nourishment, climate, etc., have been the principal factors in producing the enormous wealth of forms. How great is the importance of such natural requirements as

climate, food, motion, salt, etc., to the living organism, is shown us by the recent experiments conducted by Doctor Karl von der Malsburg.[5]

The doctor turned his attention first to the origin of life, the cell; which is the workshop of all preliminaries of life's processes. A cell, whose plasm is of exceptional vitality can exist only in comparatively inconsiderable size, without a depreciation of its vitality, since the more or less favorable condition is determined by the comparative size of the surface to that of the mass. The smaller the volume of the cell appears to be, the greater is the surface in proportion to the mass, since, as you know, the mass increases, as the cube and surface, only in proportion to the square of its diameter.

Since food and oxygen reach the cell only through its wall or surface and the products of oxidation, which as is known are poisonous and exercise a paralyzing influence upon the action of the cell, are excreted only by the surface, the importance of a relatively large surface becomes obvious. Thus the cell, whose surface is comparatively great and whose volume comparatively small, has the greatest vitality.

This assertion is also confirmed by the cell-division, natures method for increasing the amount of surface, and which according to Rudolf Leukart, takes place, only when the growth extends beyond the individual limits.

Thus, it is obvious, that an otherwise healthy cell must become hindered in its life-process by the absorption of moisture, which undulates the molecules of the colloidal plasm by which the connection of the particles of plasm, as well as the action upon the same from without becomes more difficult. Metabolism in such a cell with a specific small surface is inert and slow.

Such a cell devours much but assimilates little, while it stores up nourishments, it does not utilize it for active production, e. g., it accomplishes little. While, owing to its water-contents, it has a better medium for solution, the process of decay in the exchange of matter becomes depressed. By their exchange of matter less oxidized end-products, as fatty acid, fat, albuminoid, and nitrogenous matter of higher chemical organization originate, which are not secreted, but are employed for the upbuilding of the protoplasm of the cell.

It is different with the small cells, those with a large surface compared with the mass. In these originate mostly completely oxidized chemical compounds as carbon dioxide, water, urates, etc. These cells develop more energy, such as heat.

A coarse, strongly-watered cell possesses very low vitality and the more it gains in mass, the more it loses in energy and elasticity.

Another very favorable histo-biologic disposition of the cell is, when its plasm from the beginning of its existence is deficient as regards its chemical make-up.

Since every higher organism is made up of cells, these three kinds of cells must produce three kinds of organisms, which differ mainly in their forms.

The great American biologist, J. W. Conklin, holds that the specific size of the cells is responsible also for the characteristics of species and proves that the particular size of body within the same group of animals is only a function of the varying size of cells. Hence originates also the astonishing and abrupt contrast between small and large forms of the same species of animals, which refers mainly to its exchange of substance, the latter becoming stronger the smaller the animal and its cells. While such an animal requires more nourishment, it in return produces more heat energy, and performs its function with more elasticity, than a coarse organism consisting of coarse cells.

That such a difference really exists is proven by Pfluger, Collin and Ruebner.

Professor von der Malsburg has experimented with rabbits, mice, dogs and sheep in order to test the action of salt, exercise, rest and the absorption of water.

His experiments prove, that an abundance of water, salt and rest produce coarse cells, and with that is connected slow temperament, obesity and deficient fertility. Dry feed and exercise produce a small cell, lively temperament, slender growth, greater organic vitality and increased fertility.

Dr. F. Rogozinski has also determined that by exercising, the muscle tissue loses a considerable amount of moisture.

Prof. von der Malsburg is of the opinion, that a similar action is also produced by moisture in the atmosphere. It is a fact, that the home of the heaviest, coarse-celled domestic animals is found in damp, salt-containing regions as England, France, Holland, Oldenburg, etc.

Thus, acclimatization is really an adaptation of the histo-biologic structure of an individual to other physiological requirements, for existence, in a new habitation.

With the above mentioned facts in mind, it also becomes clear that fine-celled animals are easier acclimatized than are coarse-celled. Young animals survive the change much better than older ones, because of greater plasticity of their body-cells. The chorological distribution of the coarse-celled domestic animals of any kind is therefore much less extensive than that of the fine-celled animals, since the former are limited only to districts which are preferred as to nature and culture.

Professor Duerst-Bern states that the occidental, cold-blooded, heavy horses in the dry climate of North Africa develop, within a few generations into light, fine-celled animals; which has also been observed by Professor von der Malsburg in horses and cattle imported from England to Australia.

Burchard von Oettingen, foreman at the brood farm of Trakehnen, informs us that pure-bred percherons, when brought to the beautiful pastures of the Russian breeding-station at Derkul, lose their race-type and in two generations receive an Arabian expression. Only the fullness of the croup reminds one of the percheron, while as to nobleness and liveliness one would be led to believe them to be an Arabian cross.

Thus, the truth is confirmed in these experiments, that the race in the first succession is a product of the clod.

It is impossible for the breeder to change only one organ by artificial selective breeding; he must make also other changes upon, or dependent upon, the change which he desires. A knowledge of this fact is absolutely essential in the selection of material for definite productions. For instance the breeder would never succeed in obtaining in a milk-cow, besides the highest milk-production, high feeding qualities; both characteristics stand to one another in reverse relation. If one would grow horns of the weight of those which are a peculiarity of the ibex, upon our domestic goat, a great structural change of the body would necessarily go hand in hand with the increase in the size of the horns. The head would become thicker, the neck, throat-musculature and the bones of the anterior extremities etc., would develop stronger, in order to adapt themselves for the greater burden.

Every organism bears a condition of balance between its various parts, which changes itself according to circumstances and thus by adjustment again establishes harmony of the whole. This dependence of the different parts upon one another is designated as correlation (altruism),[6] of the organs.

The breeder must, of course, give the widest consideration to this correlation of of the parts, which are in most cases inexplicable, but play an important role in the upbuilding of species and races. The following are examples of correlative variability and in a measure illustrate it:

In connection with Addison's disease, a disease of the adrenal gland, a peculiar pigmentation of the skin develops, which therefore bears the name Bronce-disease. After extirpation of the thyroid gland or its atrophy from disease an excessive development of mucus and adipose tissue under the skin, the so-called myxedema, are observed. Genuine diabetes mellitus follows the atrophy of the pancreas; as a result of insufficient nourishment (nutrition) intoxication from the alimentary canal takes place. Baldness[7] is connected with poor or failing mastication.

In artificial selective breeding three factors must act together: first, the ability, to verify, second, intelligent selection by the breeder and third, the ability of the particular animal to transmit its bodily and mental characteristics. If any one of these requirements be lacking the production of a new species or race is completely excluded.

Similar factors, as in the artificial selective breeding were accepted by Darwin, regarding the evolution of the species and races in nature, which process he called

"natural breeding." In place of the breeder, Darwin places the struggle for existence, while the two remaining factors are the same, as in artificial breeding.

Not all phenomena could be explained by this theory, for instance structures, which could not be considered as advantageous to the individual, either for its preservation or propagation are almost universally encountered: thus the manes and bunches of hair of many animals, the bright color of birds, fish and butterflies, the secondary markings of sexes. In order to find an explanation for these peculiarities, Darwin advanced the theory of the "sexual selective breeding," and his conclusion was, that these and similar markings were developed by this agency. He argued that the strongest and best armed males in the struggle for the female had the greatest chance of success and of propagating their qualities, thus to transmit their markings upon the progeny; further, that the female granted the preference to the male, which was best endowed with the above mentioned beauty markings. But this theory is the weakest of Darwin's teachings, and today has been forced to give place to a different explanation, which conforms more nearly to the finding of investigators and recent advancements in the science of biology. Moreover, Mayer and Soule have by experiments on butterflies, proved that a preference as to beauty by the female does not exist; furthermore, it is not likely, that animals' conception of the beautiful should coincide with our own.

Mayer exchanged the wings from the male to the female butterfly but could not observe the least change in their behaviour; only when the wings were entirely removed from the male did the female show aversion and accept him with reluctance.

Emery[7] in the year 1913 gave expression to the opinion that the internal secretion of the genital apparatus determined the formation of the secondary markings of the sex, which view has hence been confirmed by numerous researches, also by the work of Bouin and Ancel regarding the testicles of mammalia.

The great systems, Darwinism and Lamarckism, which comprise the entire theory of evolution, were not sufficient for the ever-searching mind of man. Soon extensions were built upon these, which, while they are true, all originate from and are built upon one or the other of the great theories, but they recognize more fully the individual factors in the transformation that occus in animals.

The oldest theory of the origin of species, one developed during Darwin's time, is that of isolation, founded by Moritz Wagner. The principl claim of this theory is, that accidental variations can only contribute to the origin of the species, when the changed individuals become widely separated. The island fauna furnish important substantiation of this theory of the descent of animals. Although they are very similar to those of the continent they show certain singluar characteristics.

Doctor Hagemann[8] could determine great structural deviations in the skull and proved that these deviations from animals of the continent could be referred to isolalation, viz., inbreeding. It is also known that on small islands insects are unable to fly[9] owing to their wings having been lost because individuals which fly least run the fewest chances of being carried out to sea and lost. Thus, selection finally brought about the absence of wings.

Wagner also suggested a physiologic isolation, by the changing of the genital organs, when the change becomes apparent sufficiently to render fertilization possible only under unusual circumstances or even altogether impossible. Wagner, Darwin's scholar, and Gulick, a missionary of the Sandwich Islands, were the principal representatives of the theory of physiological isolation.

Even Darwin acknowledged the isolation as an important factor and referred to Wagner's work in his book regarding the evolution of species.

Darwin presumed a variability of the individuals, but only because he was unable to assign a generally binding reason and only for a few cases endeavored to prove positive reasons for the same.

Since the selection can figure only in sizes—for instance, the spur of a rooster becomes of value only when it has become large enough so that the animal can use it as a weapon—many investigators pro-

nounce the selection as not of great importance. They say, that selection does not create new species, but can influence only that which is already present, and to a certain extent a developed characteristic; therefore is limited to preserving or rejecting, and is incapable of developing them.

The theory of organic selection, among whose champions should be mentioned Baldwin and Osborn of America, and the Englishman Lloyd Morgan, is the result of an endeavor to avoid the objections given above. Its adherents claim that when a variation originates under the influence of habitation and accidently meets one with the same disposition, these together have a greater influence and gain in value; that is, the variation is more firmly stamped on the offspring. Darwin's theory is based on the supposition of fluctuating variations which are distributed over a great number of individuals and which differ only gradually, often only in minimal amounts.

Numerous observations prove that no two individuals are alike. Thus, Professor Studer[10] of Bern by numerous measurements of skulls of wolves, never found any two exactly similar, usually there were great deviations, although the animals originated from the same region. Doctor Heinke, has carried on careful counts and measurements of the separate organs of the common herring and has proven puzzling deviations in the make-ups of animals in the same habitations.

Darwin often mentions hereditary and non-hereditary variations, to which latter he attributes no significance in the development of new species, but he could not always separate the two, since the experiment to determine whether or not a certain variation was hereditary was wanting.

According to de Vries, a species is not at all times equally variable, but the variability proceeds periodically and its amount is not constant. For example, a plant can at certain times produce different formed progeny, which become the family-head of a new species; but after that it may remain unchanged through many generations. The same line could at first be variable but afterwards would return to a constant form. The reason for this period of mutation at certain times is not known.

Bauer[11] defined the mutation and modification as follows: "What we see as any characteristic in a plant, is always only the result of the reaction of that particular individual to environments in which it has happened to develop; and this modification through the external requirements is, in plants especially, much greater than one usually presumes. All of these modifications however, are purely temporary. Just as melted paraffinum durum, when one lowers the temperature, again becomes solid, a primal stock which has for months bloomed white in a warehouse, again becomes red when placed in a cooler culture-room. The characteristic species of the Primula sinersis rubra does not change through culture by light temperature any more than the melting point changes by heating of the paraffinum durum; or in other words, such medifications are not hereditary.

The theory of mutation daily gains new adherents. While it cannot replace all other theories, it certainly suggests a way towards the solution of our problem. Its reality is backed by de Vries, Tower, Morgan, Standfuss and others. De Vries, no doubt deserves the honor for having created a theory which is founded upon experiment. He deserves the credit of having furnished undisputable proof, that new species may be formed without a slow, gradual declension.

Thus we see that all theories which we have just discussed, explain only a part of all appearances in nature, while they leave a great deal still unexplained. We have, however, come to the conclusion, that not all processes in the development of forms can be explained in the same manner. All of these explanatory experiments have their authority side by side and they do not exclude each other. All these factors upon which each theory is built and the phenomena, which each explains, have surely been active in the development of new species, but the complication of the mode of action, the share of each factor, can be determined only with difficulty.

A principal mistake of all of these theories is, that the founders of the different systems have proceeded in a too narrow manner and have granted a certain factor the

preference over the remaining. However, in order to arrive at the important conception of the transformation of the living being, we still need a better understanding of the source of life, of the physico-chemical condition of the cell, of which we know little as yet. Then a mechanism for transmitting the acquired characteristics to the descendants shall be found, and we can expect with confidence the solution of the question of the origin of species. Then and not till then can our live stock breeders proceed in an intelligent scientific manner and be certain of certain results in advance of their attainment.

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Contagious Abortion in Cattle*

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Synonyms: Infectious abortion of cows.

History: Mascal in 1567 noted that as high as 50 to 60 percent of the cows aborted in certain localities in England. d'Arboval in 1826 contended that there was a contagious abortion among cows. This view was also held by Youatt in 1834. Lehnert, in 1878, introduced the placental tissue and vaginal discharge of aborting animals into the genital tract of pregnant cows, with the result that the experimental animals contracted the disease. Brauer, likewise conducted experiments with similar results in 1880. Nocard, in 1885, was the first to study the vaginal discharges of affected animals in an effort to determine the cause of abortion. He came to the conclusion that the infection was carried on straw and litter from infected to non-infected animals. But it was not until 1897 that Bang and Stribolt isolated from the uterine contents of a cow showing typical symptoms of abortion an organism with which they were able to reproduce the disease both by intravaginal and by intravenous inoculation. This organism is now accepted by bacteriologists as the cause of contagious abortion in cattle.

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Bang and Stribolt obtained this organism from a cow exhibiting symptoms of impending abortion that was slaughtered and had the uterus removed and opened under aseptic precautions in the laboratory. An abundant yellowish, odorless exudate was found between the uterine mucosa and the corium. In this exudate they reported finding a very small bacillus apparently in pure culture.

Fabyan produced abortion in pregnant experimental animals by inoculating with the B. abortus subcutaneously, intravenously and intraperitoneally; but not orally or vaginally.

Zwick in 1910 issued a preliminary report on the bacteriological investigation of contagious abortion made by the German Imperial Health Office. In this report it is shown that the bacillus abortus of Bang is the causative agent of this disease in England, Germany, Holland and Denmark. He also demonstrated that there are different strains of the organism. MacNeal and Kerr in the same year showed that contagious abortion due to the Bang bacillus existed in Illinois. Coincident with this, Goof of Kentucky identified the disease in that state and Hadley and Larson proved the existence of the disease in Wisconsin.

The latter were the first in this country to apply the complement-fixation test.

Animal Inoculation: Lesions Produced.— Fabyan injected a guinea-pig subcutaneously with one-half cubic centimeter of a physiological-salt-solution emulsion of a small piece of cotyledon from an aborted placenta.

This animal was killed eleven weeks later and the spleen and lymph nodes were found to be abnormally large. Other pigs were inoculated with material obtained from this diseased pig and serum from these showed agglutination up to 1:1000. Serum from control pigs showed no agglutination. The inoculated pigs lost weight and had a slight elevation of temperature. Blindness, swelling of the extremities, weakness of the posterior limbs and constipation may develop but usually subside after a few days. The superficial lymph nodes may become palpable.

On autopsy the experimental animal may appear normal or emaciated. Opacity of the cornea or swelling of the extremities may be present. All lymph nodes are enlarged, the body glands more than the visceral. Adhesions were sometimes found in opening the abdominal cavity of those cases that had been inoculated intraperitoneally. The spleen, which was involved in 98 percent of the cases, was enlarged and showed numerous grayish, opaque, pin-head foci just beneath the capsule. The splenic pulp was soft and swollen obliterating, in part, the normal markings. The liver was involved in 75 percent of the cases and although practically normal in size showed congestion with grayish, translucent, pin-point foci scattered over the surface. The pancreas was unaffected. In 29 percent of the cases the kidneys were affected, round, pin-point grayish foci, studded the surface. The adrenal glands may contain nodules. In 40 percent of the males injected the testicles were involved. In 65 percent of the cases the lungs were involved showing the characteristic nodules. In 27 percent of the cases the bones were involved and on section a small amount of pus or yellowish granular material oozed forth.

Schroeder and Cotton in 1911 reported the finding of an organism in milk which produced the lesions above described when inoculated into guinea pigs. Mohler later showed this organism to be identical with that of contagious abortion of cows. The complement fixation test was used for the identification. Melvin states that the Bureau of Animal Industry laboratories have found this organism in 8 of 77 samples of market milk which was tested or in over 11 percent and in the milk distributed by six among 31 dairies or in 19 percent. The report does not state whether these dairies were investigated to see if contagious abortion existed in the herds.

Source and Mode of Infection: The chief source of infection is probably the vaginal discharge of infected cows. There is some evidence that the cow that has established active immunity may prove a chronic carrier of the disease.

It is generally considered that the infection may reach the uterus at the time of copulation or find its way into the vaginal tract after conception. Some have expressed a belief that infection may take place through contaminated feed.

Clinical Observations (In the cow): If the cow aborts early in pregnancy there may be no noticeable premonitory symptoms. In other cases there may be noted a slight yellowish-white, odorless, slimy, flocculent discharge from the vulva. The animal may appear dull and remain away from the herd and may be restless for three or four hours before aborting. In lactating animals there is usually a decrease in the flow of milk. In heifers the udders and vulva may suddenly enlarge as if parturition were approaching. The vaginal mucous membrane of a cow that has recently aborted may be somewhat reddened and show a papular eruption. If the os uteri be opened before abortion a quart or more of yellowish-white fluid may escape. If the fetus aborted near full term lives it is usually weak and sometimes referred to by cow owners as a living abortion. Contagious abortion generally causes the expulsion of the fetus between the fifth and sixth months of gestation. In herds where contagious abortion has recently gained a foothold the animals may abort much earlier than where the disease had existed for a considerable time. The fetus is usually dead when expelled. The animal

slowly gains an active immunity and finally ceases to abort. The duration of immunity is an important factor and should be definitely determined. It has been observed that a cow may cease aborting, deliver two or more full term normal fetuses, and later again abort. Heifers usually abort earlier in the gestation period than do cows.

Hadley gives some interesting statistics as to the number of times a cow may abort. Of one herd of 700 cows where careful records were kept, 133 aborted in a period of three years. Of those that again conceived 28.6 percent aborted a second time, 14.2 percent aborted a third time, and 57.2 percent aborted but once.

Hutyra and Marek state that the Bang bacillus also produces contagious abortion in mares, ewes and goats. Good, investigating contagious abortion in mares in Kentucky, found a short plump bacillus; but on the other hand Ostertag found a streptococcus.

Changes in the Uterine Mucous and Fetal Membranes: Bang considered the disease a uterine catarrh. McFadyean and Stockman describe the cotyledons of aborting cows as being pulpy, soft and of a grayish yellow color. They found the placental membranes in some instances slightly involved and in others extensively diseased.

Wall maintains that when infection takes place through the vagina the cotyledons become the primary seat of the disease and when by the blood the mucous membrane of the uterus becomes first involved.

Treatment: If the aborted fetus is of considerable size the fetal membranes are usually retained and should be removed. Neglect of this has resulted in the loss of the cow. The fetus may be retained and mummification result. The uterus should be irrigated with a warm mild antiseptic and all fluid later removed. Permanganate of potash in two percent strength may be used. The tail and external genitals as well as the legs should be washed with soap and water which contains two percent carbolic acid. The depth of folds in mucous membranes of the uterus holds mucous and other catarrhal products and is hard to reach by the irrigation fluid. Organisms situated in the mucosa are likewise difficult to reach with germicidal fluids. Irrigations should be continued till all discharge has ceased. The animal may then be bred.

All fetal membranes, the bedding and soiled litter should be burned. The cow should be isolated till all vaginal discharge has ceased. All bedding should be changed daily, the old bedding burned and the floors disinfected with some good disinfectant as two percent carbolic acid. A separate bull should be kept for the aborting cows and under no consideration should such a bull be allowed to serve cows not afflicted with the disease. The bull's sheath should be thoroughly irrigated after each service and a short time before serving, using a tablespoonful of permanganate of potash to a pail of water or a two percent solution of creolin or lysol. The affected isolated cows should have a separate attendant and this attendant must not be allowed around the well cows or to hang his clothes where there is danger of contaminating the clothes of other attendants and thus serve as a possible means of transmitting the contagion.

Carbolic acid internally has been advocated by some but has not come into general use and many unfavorable reports make its value doubtful. According to Peters the carbolic acid is prepared as follows: "Crude carbolic acid is liquefied and a small amount of glycerine added to keep it in liquid form at first. Two drams of this mixture is mixed with bran and then gradually increased until it amounts to about six drams a day. The dose is increased accordingly to the virulence of the disease. Best results have been obtained by giving large doses to cattle where the percent of loss was very large."

Newly purchased cows should be quarantined and receive daily vaginal irrigation with a reliable antiseptic solution unless it is definitely known and there has been no chance of infection before purchase. The writer is at the present time experimenting with a vaccine in the hope of developing one that will produce immunity to this disease. Others in this country and Europe have been working along similar lines. As there are several strains of the organism involved either an autogenous vaccine will have to be prepared or a stock vaccine containing several strains. The

vaccine to be efficient must be properly prepared.

Economic Importance: As stated above immunity to contagion appears to develop in many animals after aborting from one to three times. In more than 50 percent of the cases this takes place during the time occupied in the period of the first abortion. This immunity lasts for a time and the animal is often sold or slaughtered at the very time when she is ready to give good service as a breeder. The writer knows of an instance of this kind which illustrates the point: Mr. A. had four cows abort in five months. As an experiment a vaccine for the purpose of producing immunity was recommended. Other sanitary precautions and care were observed. The owner was advised not to sell the infected cows for reasons given above and not to introduce new cows until the disease could be eradicated. He could see it only one way and that was to sell the cows that had aborted. This he did, at a price that represented a sacrifice of their dairy value, notwithstanding the fact that two of the four would probably have acquired a natural immunity and that intelligent treatment might have reduced his loss still further.

To the dairyman the loss of the immature fetus is not the chief item to be charged against contagious abortion as the yearly flow of milk from an aborting cow is much less than it would have been had she delivered a normal calf, and she may prove sterile for one or more years or even permanently thus lessening or destroying her dairy value.

Although abortions due to the B. abortus are classed with the contagious diseases little or no effort has been made by legislation to prevent its dissemination.

So far as I can learn there is no law prohibiting the importation of infected cows into any state, nor are there any restrictions placed on the passing of infected cows from county to county.

One investigator has estimated that the loss in Wisconsin is $10,000,000 annually. A similar estimate has been made for the state of New York. There is also a heavy loss in Illinois as well as in New York and other eastern states. The disease appears to be less prevalent in the south and west. Better bred cattle and intensive farming, in short, close housing, favors the spread of the disease. In range country the cattle as a rule are not of so well bred, not so closely housed, but have large tracts to run upon, hence they are not in so close contact, furthermore the interchange of animals from one herd to another is less frequent in the South and West than in other parts of the country.

Finally in closing I wish to say that in the light of our present knowledge of the ravages of this disease it is high time we were looking to its control and eventually its eradication.

Case Report: The following report from an infected herd, near Greeley, Colorado, which was investigated by the writer during the past summer, illustrates the history of an outbreak with the gross and the microscopic pathologic findings.

The herd consisted of about forty Guernsey cows, some pure-bred and other grades. The first aborted July 6th, another July 20th, the third one August 5th, and another about a week later. There was no noticeable discharge from the vulva or other premonitory symptoms in these cows before abortion. The fetal membranes were removed as soon as abortion occurred by the attending veterinarian, Dr. R. H. Bird, and the uterus irrigated with the following solution: Bichloride of mercury one dram, glycerine one ounce, alcohol one ounce and water, one gallon. Each uterus was irrigated with one gallon and the fluid removed. Bichloride in this proportion (1:1000) causes considerable straining. Once a week a like solution was used to irrigate the vagina of the pregnant cows and heifers not aborting. The aborting cows were isolated, the bedding changed, the old bedding burned and the floor disinfected.

The last cow to abort was brought to the herd from Wisconsin, one of the others from Pennsylvania and a third from Colorado, the further history of which could not be determined. The fetus of the fourth animal to abort was carefully washed in two percent lysol and wrapped in clean gauze saturated in a similar antiseptic, the fetus was then packed in ice and sent to my laboratory.

Autopsy: A fetus between the fifth and sixth months of development. All organs appeared normal except the liver. The liver weighed 290 grams, the borders appeared rounded and the surface showed congestion and evidence of areas of hemorrhage. The miscroscopic findings were as follows: Hemorrhage and acute inflammation present, the hemorrhage being greater under the liver capsule. There was noted many epitheloid cells with large round or oval nuclei containing a small amount of chromatin material peripherally. Among these was found a round-celled infiltration, which was most marked in the perivascular spaces.

A few polymorphonuclear leucocytes were scattered through the section. Passive congestion and cloudy swelling was present.

The cotyledons at the extreme point of the horn of the uterus occupied by the fetus appeared hypertrophied and soft. Microscopically the sections showed hypertrophy, congestion and an invasion by polymorphonuclear leucocytes, a few lymphoid cells and areas of round-celled infiltration, especially perivascular.

Bone-Spavin*

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THIS may be defined as a slowly developing inflammatory process primarily involving the *cuneiform parvum*, the *cuneiform magnum*, and the *metatarsus*, and generally extending to the articular cartilage or periosteum, or both. An external bony enlargement is usually present, but when this exostosis is absent the condition is referred to as an "occult spavin"; in the latter condition the ossific matter may, nevertheless fill up the spaces between the bones.

The etiology of this condition is rather difficult to explain in individual cases, as the multiplicity of causes that may operate are so varied as to be rather puzzling in many instances. I believe it is generally agreed that the peculiar anatomical construction and the physiological functions of the hock joint are largely responsible for the disease affecting the inner lower surface of the hock. The posterior limb cannot be carried forward in a straight direction, on account of the screw-like character or downward and outward direction of the astragalus, without twisting the bones of the joint. The powerful latter ligaments and the ginglymoid character of the articular surfaces inhibit all lateral movements, except in the lower internal part of the joint where the protection by powerful lateral ligaments is least and movement comparatively free. If now the physiological action of the limb is interfered with either by high calks, rough ground, sudden extreme weight bearing, etc., then the weakest part, namely the lower internal surfaces of the hock joint, is subjected to powerful strain of the ligaments and irritation of the bones, setting up the primary inflammatory process. This constitutes the mechanical theory of Peters, and I believe should be considered the dominant factor in the production of bone spavin. It is true that in the majority of cases one or more contributary conditions may be held as accessory causes. It is very probable, as Diekerhoff contends, that cunean-bursitis may have considerable influence in starting the disease in some cases, but it is undeniably true that a bone spavin may exist without involvement of the bursa. Again when the tarsal bones of the lower row are not developed in relation to the bones above, causing the animal to be "strangled" or "tied in" at this point, the upper structures, especially a well-developed calcaneous, acting with more than ordinary power soon produces a strain and inflammation in all animals subjected to severe services. Finally not only the conformation of the part, but the peculiar

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structure of the bone, giving rise to an ossific diathesis, is transmitted from parent to offspring constituting a hereditary predisposition which is considered to be of such importance that all animals affected with a bone spavin, and especially those intended for breeding purposes, are unsound in the true sense of the term.

The actual changes taking place in the involved bones during the developmental stage may be briefly summarized as follows: There is first a rarefying osteitis in which small spaces make their appearance in the bone; these are filled with a soft reddish material resembling granulation tissue. This process may be succeeded by a condensing osteitis. The inflammation may extend to the articular cartilage or periosteum, or to both at the same time. The changes in the articular cartilage are in the nature of a degeneration, with an active exudation and a proliferation of cartilage cells generally resulting in an internal ankylosis. At the same time the inflammation may extend outward involving the periosteum and setting up an ossifying periosteitis causing the appearance of an external exostosis and generally an external ankylosis. Both the internal and external ankylosis is usually complete in young and middle aged animals resulting in complete recovery from the lameness in course of time. In older animals the external ankylosis is usually complete, while the internal ankylosis is generally incomplete, the exposed *cancelli* are in contact and lameness remains. This explains also why the external exostosis is the result and not the cause of the disease, and therefore a spavin enlargement may be present without spavin lameness, or on the other hand, if no exostosis occurs, there may be a spavin lameness without a spavin enlargement.

Spavin lameness as a rule develops slowly, keeping pace with the degenerative and inflammatory processes in the bones. As brought out in the previous paragraph the exostosis may precede or succeed the lameness; it may occur at the same time or it may never make its appearance. One of the first symptoms frequently observed is the sudden jerking of the affected limb resembling string halt; this may be aggravated by turning the animal, before exercise has been indulged in, towards the sound side. The limb is incompletely extended in a great number of cases, the last phase of the stride being shortened and as a consequence there is an exaggerated hip action. The fetlock becomes more upright, and the animal wears the shoe excessively at the toe. It is quite characteristic of spavin lameness to disappear with exercise, but it may be constant and in old standing cases its severity frequently increases with exercise. The "spavin test" which consists in strongly flexing the hock for one minute, then starting the animal off sharply at a trot, greatly increasing the lameness in true cases, is of great value, but should be used with care especially in old or rheumatic animals.

The examiner should satisfy himself that lameness is not due to mechanical interference with proper flexion of the joint as this is incurable by any line of treatment. Also a lack of symmetry in the hocks is not a positive sign of a spavin, though at the same time the term "coarse hock" is frequently used as a thin-veiled disguise for an actual spavin enlargement.

The prognosis of spavin lameness is favorable in well-selected cases. The fact that treatment is so frequently disappointing is due entirely to the fact that all spavined horses are accepted for treatment with a total disregard for the unfavorable pointings of nature. These latter may be regarded as follows:

1. Animals past middle age are unfavorable subjects.
2. A comparatively large exostosis well forward on the articulation is more likely to produce mechanical lameness.
3. Old standing cases that have been subjected to various lines of treatment are unfavorable as the reparative processes are sluggish.
4. Animals with "strangled" hocks are unfavorable subjects.
5. An inherited tendency to spavin formation in hard-working animals is less likely to be permanently cured.

Treatment

This is essentially surgical in character. There are four different methods, each having its own peculiar adaptation. I

wish to state at the outset that these lines of treatment do not reduce the size of the exostosis in case this is present, in fact my experience is that treatment, no matter what form has a tendency to increase the size.

The four operations above referred to are:

1. Peter's spavin operation.
2. Diekerhoff's spavin operation.
3. Sharp point firing.
4. Tibio-peroneal neurectomy.

The ultimate object of all four operations is the relief of the spavin lameness. In case of the first three mentioned, this result is accomplished by artificially producing an ankylosis of the affected bones; the fourth does not interfere with the diseased joint, but produces insensibility to pain. All lines of treatment fail to relieve mechanical lameness.

Technique of Peter's Spavin Operation.—This operation is also known as "Peter's subcutaneous cunean tenotomy or Subcutaneous periosteotomy."

The animal is placed in lateral recumbency with the affected limb undermost and fully extended. The place immediately over the diseased area is shaved, disinfected and anesthetized with a local agent, preferably a stovaine solution. An imaginary line is drawn forward across the head of the metatarsus having its point of origin at the lower end of the chestnut; in the middle of this line and parallel to it an incision is made through the skin about one-half inch long, a pair of closed scissors is inserted under the skin through this incision and directed upward and forward toward the internal malleolus of the tibia for a distance of about five inches; the instrument is partly withdrawn and redirected subcutaneously towards the point of the os calcis for a similar distance. A Peter's spavin knife is next passed into the groove first made, being passed flatwise with the back of the blade toward the saphenous vein in order to avoid cutting the latter during a sudden struggle. The blade of the knife is then turned up and its cutting edge sharply and deeply rocked over the underlying cunean tendon. Withdrawing the knife, it is passed into the posterior groove and again rocked over the cunean tendon, and in this way a V-shaped section is separated from the tendon and the periosteum is slit. The wound in the skin is closed with a single interrupted suture, a 1 to 2000 bichloride pack applied, and the animal kept standing in a single narrow stall for at least six weeks. If this latter precaution is not observed, or if the operation is performed during the fly season, ankylosis will not take place and there will be no relief from the lameness. A smart counter-irritant applied over the operative area once a week is of great value as it makes the part sore and keeps the animal from moving it.

The particular indication for this operation is in "occult spavin" or where the exostosis is so small as not to embed the cunean tendon. Its particular value lies in the fact that it leaves no appreciable after-scar; it relieves pressure on a painful exostosis both by cutting the overlying cunean tendon and the periosteum; it favors ankylosis owing to the renewed stimulation of the inflammatory process.

If proper antiseptic precautions are observed no bad results follow this operation. It has been claimed that there is danger of opening the joint, but personally I have never experienced this. Sometimes a small amount of synovial fluid will escape when the knife is withdrawn, but this originates either from the bursa beneath the cunean tendon, or from the sheath of the inner head of the perforans.

Diekerhoff's Spavin Operation. The patient is prepared the same as for the preceding operation. It is also a cunean tenotomy, but supplants the preceding operation in all those cases where the cunean tendon is deeply imbedded in a groove in the exostosis, so that Peter's spavin knife cannot reach it.

An imaginary line is drawn from the head of the internal small metatarsal to the internal malleolus of the tibia. Immediately over this line, and at a point where it bisects the cunean tendon, an incision is made through the skin and subcutaneous tissue, exposing the cunean tendon and the bursa. After controlling the cutaneous hemorrhage, the latter is opened and the tendon elevated by means of a pair of scissors or other instrument, the tenetome passed under it and the structure severed at a single stroke. It is not necessary to

remove a part of it, though this may be practiced. The skin wound is closed with several interrupted sutures.

The after treatment and care correspond in every respect to that adopted following Peter's operation.

Sharp Point Firing. This operation I perform on those cases of spavin lameness where the exostosis is so large that the cunean tendon cannot be reached by either of the previous operations. It may also be performed where Peter's or Diekerhoff's operations have proven unsuccessful. It is not to be adopted as a primary operation on account of the danger of opening the articulation and the tell-tale scar it leaves behind. Neither do I consider it as efficient in the more acute cases because it does not relieve the tenderness produced by the pressure of the cunean tendon or the periosteum. For old-standing cases, with a large exostosis, it is the treatment *par excellence*, as it has a tendency to change the chronic process into an acute one, thus favoring ankylosis.

It is performed in either the standing or recumbent position. If the former is adopted, the opposite hind limb should be lifted with a side line passed forward and around the animal's neck. A stovaine solution may be injected over the sensory nerve supplying the part.

The firing iron should be of a cherry-red heat and kept at approximately the same temperature. The first point is to be placed in the most prominent part of the exostosis; all others should be at least one-half inch from this and should be symmetrically placed. Too close placing favors necrosis of the skin, which is to be avoided. The point of the iron should be placed in the various openings several times, in regular rotation, so as to get an even distribution of the heat without actual burning, and until a depth of at least one-half inch has been obtained. A blister may be rubbed into the openings, but this should be thoroughly washed out after twenty-four hours. The blister may be reapplied with advantage weekly. The animal is to be kept in a standing position, preferably in a single stall for at least six weeks, after which it may be turned out and gradually brought back to work.

Tibio-peroneal Neurectomy. On account of the degenerative changes likely to follow this operation, it should only be adopted as a last resort in order to render an animal serviceable for a time. If the lameness is of a mechanical nature, it will be ineffectual.

The nerves operated upon are the posterior tibial or the sensory continuation of the great sciatic, and the deep peroneal nerve or the sensory continuation of the anterior tibial.

The animal is placed in lateral recumbency, preferably under general anesthesia, with the affected limb undermost. The posterior tibial nerve can readily be felt through the skin. An incision is made immediately over the nerve and down to it, the point of operation being about five inches superior to the tuber calcis and one inch anterior to the tendo-Achilles. The nerve is elevated and an inch or more of it removed. The same precautions adopted in other nerving operations should be observed here.

In order to perform the peroneal neurectomy the affected limb should be uppermost. The incision through the skin and underlying tissues should be about one and one-half inches long, on the dividing line between the anterior and lateral extensors of the digit, and at the upper third of the tibial region. After making this incision and just under the common fascia a small sensory nerve is found, i. e., the musculocutaneous, which must not be mistaken for the deep peroneal. To find the latter we must penetrate almost one inch deeper, the nerve being found along the posterior surface of the muscular portion of the anterior extensor of the digit and anterior to the intermuscular septum that separates this muscle from the tibialis anticus or the muscular portion of the flexor metatarsi. A section of the nerve is to be removed, and healing of the wound by first intention attempted. The animal may be returned to work in about ten days.

By following this outline a practitioner will render more satisfactory service, a service based upon strictly practical grounds during every minute of which the veterinarian knows exactly what to do and what results to expect. It does away with the unsatisfactory method of handling these

cases with counter-irritants and caustics, which is so much in vogue and places veterinary surgery more securely than ever on a thoroughly scientific basis.

Sterility in the Mare and Cow*

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STERILITY is commonly called barrenness, infertility, unfruitfulness, or simply failure to breed. Breeding is normally a physiological process which depends, primarily at any rate, upon estrum and copulation followed by fertilization of the ovum. It becomes pathological when conception fails to take place in consequence of some alteration of structure or function of the generative organs, or of some systemic disturbance. Abnormal conditions of both the male and female genitals are usually, but not invariably, accompanied by sterility; the latter is thus closely connected, if not identical, with the pathology of breeding.

The terms relative or absolute, temporary or permanent, partial or complete, are frequently used. Animals which come repeatedly in use are cast from the stud or herd after a certain time in spite of the fact that some of them would eventually conceive. In ordinary practice, however, it is not possible to draw fine distinctions, and an animal is considered sterile which fails to breed in any given year. Copulation may take place at regular or irregular intervals; on the other hand, there may be no signs of estrum, and such animals are known as "dumb bullers." Owing to the wide scope of the subject, I shall confine my remarks to the more common lesions met with in the mare and cow.

Sterility in the female is both more apparent and more frequent than in the male; moreover, the genital apparatus is more complex and parturition is a powerful determining factor. Many breeders attribute the fault more often to the mare than to the horse. That it is on the increase in this and other countries is generally admitted. The more forced or intensive the system of management the more it flourishes for the most part unchecked and unrecognized so far as its true pathological nature is concerned. This practice weakens the ovaries and uterus and other portions of the reproductive apparatus, and predisposes them to disease. Veterinary surgeons and breeders are agreed that the subject has hitherto received scant attention, whilst the latter bewail their small foal or calf crop, and their inability to perpetuate certain strains owing to the persistent barrenness of some of their best animals. Is it any wonder that the services of charlatans and quacks are requisitioned, men whose colossal ignorance is only equalled by their supreme self-confidence? No branch of professional work lends itself more to the practice of empirical methods. The empiric is very mysterious, and therein lies his charm; the curtain is drawn across his many failures, whilst his successes are lauded with characteristic modesty. A change of bull or stallion, especially a young animal, more attention to details of management, artificial insemination, or (tell it not in Gath!) time alone will often effect a cure, whilst both operator and owner remain in blissful ignorance as to the cause.

The Importance of Sterility cannot be over-estimated, especially in the larger domesticated animals, in which it is most prevalent. Agriculture is still our chief asset as a nation, and Britain remains the stud-farm of the world. Breeding, it need hardly be said, lies at the very foundation of agriculture, and the conditions which interfere with it are of the greatest scientific and economic importance.

Unprofitable members exist in every large pedigree herd or stud, and it is possible to make some estimate of the losses to which these give rise; farm and dairy animals, on the other hand, are frequently

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useful for other purposes, and the losses are less serious and less apparent. The annual wastage is here an unknown quantity. Nevertheless, a valuable 1000 or 1200 gallon cow of a deep-milking strain is clearly sacrificed to the butcher if the effort made to conserve her reproductive powers is unsuccessful. The loss is all the greater if she happens to belong to a breed like the Jersey or Ayrshire, whose beef value is small. Again, a regular and full supply of milk can only be secured by regular breeding. Lastly, take the case of a thoroughbred mare which may or may not produce another foal: her potential value may be $5000; the actual value *nil*.

The Prevalence of Sterility. The extent to which infertility prevails in this country is unknown; statistics, so far as I am aware, are practically non-existent. I have been able to determine the pregnancy and sterility figures in certain studs and herds of which I have had professional charge, but I am unable to say if the facts are applicable to the country as a whole. Those relating to cows probably do not, inasmuch as the great majority have been bred for milk, and milk only, for several generations. Milk records have been kept for many years, and many of the heifers and young bulls have been the produce of heavy milkers. Development on these lines tends to raise the number of barren animals, but against this must be set the fact that rich, especially artificial foods, were not pushed in any way. The heifers were put to bull early—16 to 18 months—and the average age at calving was about 26 months.

Probably about 70 percent of ponies (Welsh, polo, etc.) are fertile. And on the whole I believe that the percentage of barren mares of different breeds is about 25.

Statistics relating to cows are even more difficult to obtain. No details of cows which fail to breed each year are published in the different stud books.

In compiling these statistics I have been unable to make a distinction between temporary and permanent sterility, many cows are fattened, others are taken away to suckle calves, and in any case, in ordinary practice, no cow is kept for more than one year if she cannot be got in calf. Breeders of pedigree cows and mares lose sight of a certain number at their annual sales, many of these are sold after service.

Again, over-fattening and contagious abortion are factors which affect the figures very materially. A breeder, or the owner of a dairy herd, will often make the statement that less than 1 percent, or at most not more than 3 percent of his animals fail to breed. The statement, although given in good faith, will not always stand close investigation. It is only true in those herds which are managed on sound common-sense lines. When the sterility figure is high (up to 20 percent or more) and abortion is very prevalent, it is difficult or impossible to get information which is of value, at any rate, for publication. Rumors of a very high percentage of barren animals have reached me, amounting in two or three herds to nearly 50 percent, but these instances are probably rare, and it is most likely that some infection other than the bacillus of contagious abortion is present as the causal factor, *e. g.*, contagious granular vaginitis.

Certain anatomical and physiological points have an important bearing on the diagnosis and treatment of the conditions which give rise to sterility. The axiom that familiarity with the normal is necessary to deal effectively with the abnormal is nowhere more applicable than in the case of the genital organs. The operator must needs make himself acquainted with the internal genitalia of virgin and bred animals by means of rectal and vaginal examinations at different physiological periods. Considerable practice is sometimes needed to distinguish between what is abnormal and what is normal, and to attach the proper significance to the former. The diagnosis of pregnancy may be a matter of considerable importance in medico-legal cases; moreover a definite opinion in the case of valuable brood mares may save the owner considerable loss. The ovaries are the essential organs in that they provide both the stimulus and the germ cell.

Mare.—In the mare the size varies, usually rather larger than a duck's egg; the right ovary is frequently larger and in front of the left, and it may attain the size of an orange in a young mare. The uterine

cornua diverge from the body almost at right angles in the form of a broad "Y." When the arm is inserted into the rectum and colon about two feet, the flattened body of the uterus is felt in front of the cervix, and the hand marks the point of bifurcation of the horns, and traces them forward and outwards toward the upper flanks in the sublumbar region. The ovaries lie here a little in front and a little below the external angle of the ilium, about a hand's breadth behind the corresponding kidney; they have a firm feel, the surface is smooth, and the notch or ovulation fossa is very distinct. It is convenient to use the right hand for the left side and *vice versa*. After a little practice the ovary is located directly, without following up the uterine cornu. The cervix is examined per vaginam and per rectum; it is short, about two inches in length, and the os projects backward as in the cow; it admits one, two, or three fingers, and during estrum it may admit the whole hand. The canal is readily dilated by digital manipulation if a little patience is exercised. The vagina of the mare readily balloons or dilates, and it may almost fill the pelvis, especially if warm fluids are injected and the hand is inserted during estrum. The anterior constrictor muscle narrows the lumen of the tube near the meatus, whilst the posterior constrictor contracts the vulvar labia. These muscles are of some importance in copulation in nervous or hysterical mares.

Cow.—In the cow the ovaries are much smaller, oval in shape, and the notch is absent; the size varies from a large bean or hazelnut to a small walnut, average length one inch. Mature graafian follicles may be felt at the commencement of estrum, protruding from the surface as small fluctuating cysts from a pea upwards. The ovaries lie close to the pelvic brim below the anterior wall of the vagina; moreover, they can be easily grasped per vaginam and drawn back nearly to the vulva. In the mare this is impossible, and the organs are much less accessible. The uterine cornua in the cow are more cylindrical and they curve in a spiral manner downward, forward, outward, and then upward and backward, they are easily traced, and in virgin heifers the whole uterus can be gathered up in the hand. The cervix is particularly dense and rigid, nearly one inch thick (one-half inch in mare) and at least four inches long; the canal is ordinarily firmly closed and won't admit a finger. Further, it is spirally twisted and very difficult to dilate.

Function.—The specific function of the generative organs is, of course, reproduction. Conception takes place when the spermatozoon or male pronucleus fuses with the ovum or female pronucleus, usually in the fallopian tube. The graafian follicle ruptures, discharges its ovum, and becomes a corpus luteum or yellow body. Lutein cells containing a peculiar yellow pigment replace the degenerated granulosa cells, the blood clot is absorbed, and finally only a small cicatrix marks the spot. If, however, conception takes place, the corpus luteum behaves quite differently, it increases in size for some months, the color is bright yellow or vivid orange, and it projects prominently as a rule on the surface of the ovary. The size varies up to a hazelnut in the cow. It is of interest to note that the persistent yellow body of pregnancy, as it is called, has a certain controlling influence on the fetus; removal of the whole ovary or of the corpus luteum is frequently followed by abortion. I have repeatedly pressed it out with the result that expulsion of the fetus has occurred on the second or third day. Further, morbid conditions of the fetus and corpus luteum are said to co-exist in the human subject.

Estrum is associated with a swollen hyperemic condition of the whole genital tract. Rectal palpation shows that the cornua are uniformly swollen, dense, and elastic; further, they are symmetrical, and the swelling appears a little before the onset of estrum, and declines during the next two or three days. The cervical canal opens up under the influence of slight uterine contractions. These facts assist the differential diagnosis of estrum, various uterine affections, and pregnancy. Some cows and heifers (one calf) when tied up all the winter, show very slight signs of estrum, and they are difficult to catch unless turned out to water. A discharge of blood is frequently present on the second day when impregnation has not taken place. Many cows

come in heat about the sixth week after parturition, or before, but it may be delayed for many months in certain heavy milkers. Similarly, a mare sometimes fails to breed when she is nursing a foal. Mares are often covered on the eighth to the tenth day after foaling, but they vary a good deal. Thus they may be in use on the fifth day, and some thoroughbred breeders find their mares prove with more certainty on the third day. Brood mares are housed at night, or out of doors all winter; in any case they do not come in use, if not in foal, from the end of August to February or March. The common practice is to "use" or "try" mares twice, with a day between, if they are still in season, then again fourteen days from the first service. If not in use then, they are tried once a week for about two months. At this point I would deprecate the common practice of repeatedly trying a mare which has failed to hold. Neither mares nor cows which have copulated several times without result should be allowed access to the male until the second or third successive estrum. It is well known that frequent sexual excitement is in itself a barrier to fecundation.

Etiology

In order that a female animal may become pregnant, the discharge of fertilizable ova must take place, followed or preceded by copulation or artificial insemination. It is also necessary that active spermatozoa should pass through the patent os to the uterine cornua or fallopian tube. The causes of sterility may be considered under three heads: (1) Mismanagement; (2) systemic or general causes; (3) diseases of the genital organs. The actual cause is usually a definite lesion in one or more parts of the genital tract; mismanagement and systemic disturbances may be regarded as predisposing causes, but this division is purely arbitrary.

Mismanagement is still much in evidence, it includes errors in diet, work, or exercise, excessive sexual use, and certain facts in connection with age and breeding. The importance of diet is generally admitted by practical men, in fact some breeders go the length of saying that there is very little sterility which is not due to over-feeding. The extent to which over-feeding *per se* is responsible is not always clear, for it is frequently associated with want of exercise and over indulgence in stimulating artificial foods. When, in addition, the animal has a long milk ancestry, several predisposing causes co-exist. There is little doubt that the evolution of the milch cow and the forced system of management of pure bred and dairy stock are largely responsible for the increased percentage of barren animals. A weakened or diseased state of the genital organs is thereby induced.

A common fault is over-fattening for shows or for the sale yard. Cattle which are kept in a healthy thriving condition till they are two years old, with plenty of exercise in the open, and not shown except in milk, are comparatively immune. The sterility figure in a number of abortion-free herds managed on these lines is about one percent.

Certain foods like brewers' and distillers' grains may, and do, exert an injurious effect if used in excessive quantities. At the same time I am of opinion that no food in itself is capable of causing infertility. The statement is frequently made that treacle, maize, sugar, barley, etc., induce barrenness, whilst peas and beans increase fertility. It is true that nitrogenous foods like peas and beans increase sexual desire, but neither estrum nor copulation is any criterion of sexual soundness or ability to breed. A stallion covering 80 mares, or a bull serving 100 cows, at certain periods of the year requires a generous diet rich in proteids, but the ration needs to be considerably modified during the off season. As a matter of fact, the amount of food depends upon the age, number of services, and the amount of exercise.

Idleness alone, or idleness and over-feeding, may induce sterility in both sexes and species. A heavy stallion at the plow and a bull at draught work prove the best stock-getters. This is in accordance with the well known fact that animals which are in regular work, or getting their own living at grass, are rarely sterile. Lastly, mares and cows which do not breed are liable to lay on fat, and this has a tendency to prevent conception.

Poverty and over-work are relatively

unimportant; they act by lowering the vital powers, whereas overfattening induces sluggishness and sometimes absence of estrum. Both extremes probably diminish the blood supply, and, it may be, the innervation of the generative organs, particularly the ovaries. Ovulation is thereby prevented.

Excessive sexual use—by this is meant the service of too many females—although a factor in the sterility of males is mentioned here because it may cause considerable loss. In some countries parturition must take place at a certain season, it follows that the procreative powers of the male are taxed to the uttermost for a limited period. Abuse of this kind is commonest amongst young bulls, particularly when first put to stud and allowed to get down in condition. The semen becomes deficient in quantity and quality, it is thin and largely prostatic in composition, and spermatozoa, if present, are few in number and sluggish in their movements.

Age has some influence. Thus very young and very old animals are unsuited for breeding. In old age the sexual function may be quiescent or actually abolished; in the latter case senile atrophy of the ovaries is a fairly constant lesion, and no fertilizable ova are formed. Everybody knows that a mare covered for the first time late in life is difficult to get in foal; and again, mares which have been stabled and worked for some years may not breed until they have had a long run at grass. Bulls in confinement become increasingly lazy and heavy after four years old, and their fertility rapidly declines.

In-breeding reduces the vigor and fertility of domestic animals, but highly bred animals are also said by some breeders to be less fertile. Inquiries seem to show that some well-bred bulls are less successful as stock-getters, and in my own practice more cases have occurred in pedigree than in ordinary dairy cows.

Systemic causes include : (1) Acute and chronic diseases associated with debility, especially specific fevers. Estrum may be absent, irregular or excessive. Tuberculosis is an occasional cause in cattle. (2) Climatic and nervous influences, e. g., extremes of heat and cold, changes in the environment, and excitability. Cows which cannot be got in calf whilst tied up all winter frequently become pregnant if turned out all summer with the bull. Spring or early summer is, of course, the ideal or most natural time for conception to take place. Excitability is seen mostly in mares; some are very sensitive in the vagina, they strain violently and frequently eject the semen in spite of the fact that no injury or disease exists. In some cases of marked irritability I have found it necessary to administer a dose of chloral hydrate before service, but walking the mare about or the application of a twitch after service is usually sufficient. A good gallop will frequently settle a nervous mare and enable her to conceive.

Diseases of the Genital Organs.—The remark has already been made that a definite lesion is usually present in sterile animals in one or more parts of the genital system—in the ovaries, fallopian tubes, uterus, vagina, or vulva. I propose to deal with non-specific diseases of the ovaries, uterus, and cervix. Specific diseases other than contagious abortion are comparatively uncommon in this country. Cattle abortion is frequently followed by sterility; in many herds the number of cases bears a close relation to the number of sterile cows. Most cows, in fact, "go over" to the bull several times after aborting, owing to the catarrhal condition of the uterus caused by the specific organism, but more often to retention of the afterbirth, which is more common than in parturition at full term. In mares abortion is a less frequent cause of sterility, and it is seldom that a mare slips her foal a second time, although she is more difficult to get in foal the same year. In both animals it is extremely difficult in some cases to know if abortion is a factor, as it is quite possible for abortion to take place at an early stage without anything being noticed. I venture the statement that most cases of sterility in bred animals are referable to the previous parturition, and the commonest causes amongst British stock are: (1) Parturition, (2) abortion, (3) Overfeeding and confinement.

Almost any abnormality of disease of the genital tract may delay or prevent impregnation. In my experience cystic or fibro-

cystic degeneration of the ovaries is the most common pathological lesion in cows. In mares, on the other hand, uterine affections, especially those located in the cervix, are most frequently met with.

It may be remarked here that a close relation appears to exist between the different parts of the generative system; thus disease of the uterus, cervix, or vagina is not infrequently followed by lesions in the fallopian tubes and ovaries. Less often chronic conditions in the ovary are followed by catarrh of the uterus and cervix. Infection of the uterus readily takes place after parturition, and this spreads to other parts by direct continuity of the genital mucous membrane. In some cases extension may take place through the lymphatics. It follows that several distinct lesions, one of which is primary, are frequently met with in sterile animals, and these may require different handling.

Some idea of the relative frequency of the various local diseases which cause infertility in bovines may be gathered from the following data selected from my case books:

1. Twenty-six calves, aged 8 to 11 months. Rectal examination disclosed 35 percent abnormal ovaries, mostly cystic.

2. Forty calves and virgin heifers, aged 10 to 15 months, showed 30 percent abnormal ovaries. The great majority of groups 1 and 2 conceived at 18 to 20 months when put to the bull.

3. Thirty-eight dairy cows, average abortion for three years, 15 percent, number of sterile animals 8 percent. Of the latter 86 percent showed lesions in the ovaries, uterus, or both.

4. Forty-three dairy cows, 12 percent sterile, of which 90 percent were affected in the ovaries and uterus. On this farm, strange to say, only five cases of abortion had occurred in four years.

5. Twenty-six dairy cows, examination of internal genitalia confined to the non-pregnant animals, ten in number, two had diseased ovaries, one uterus, and one uterus and ovary. Percentage of abortion 18.

6. Thirty-six Jersey cows and heifers, nine non-pregnant, three utero-ovarian cases.

7. Of 130 cases of sterility, which were subjected to a thorough course of treatment, the following facts may be recorded:

	Percent	Number.
Diseases of ovaries only	52	67
Ovaries and uterus....	18	23
Uterus and cervix only	22	28
Other causes.....	9	12

A few of these 130 animals were virgin heifers, a larger proportion were first calvers, but the great majority were cows four to seven years old. Twenty animals (15 percent) suffered from dumb (absence of) estrum, owing to the presence of cysts and yellow bodies in most instances. The great majority showed abnormal estrum, but only 24 (18 percent) showed any marked signs of nymphomania, notwithstanding the fact that no less than 90 were affected in the ovaries. In several cases of nymphomania the ovaries were apparently healthy. The table shows that uterine disorders were present in 51 animals; these took the form of endometritis—catarrhal or purulent, acute or chronic. The chronic form was mostly in evidence, and pyometra was observed in a few cases. It is of interest to note that abortion was responsible for the majority of cases of purulent endometritis and pyometra.

In every instance marked sterility existed, and 84 animals, or 65 percent recovered and became pregnant after an average period of three months.

Congenital conditions are without the scope of this paper, but it may be remarked that the ovaries may be inactive or absent in the foal or calf. A free-martin is a familiar example of arrest in development confined to one part of the fetus; at the same time male twins are not uncommonly sterile. It is known that twins frequently suffer from incomplete development of the sexual apparatus. That the female is almost invariably sterile is, I think, attributable to the fact that the female genitalia are much more complex, and hence their growth is more often arrested at an early stage.

The ovaries may also be the seat of chronic inflammation spreading from the uterus or peritoneum, abscess, neoplasms (carcinoma), tuberculosis, and atrophy. Tuberculosis is uncommon in cows, and still more uncommon in mares, although

the genitals are frequently overlooked in postmortem examinations. Both ovaries and uterus are usually affected, and one ovary in exceptional cases may be functionally active in spite of an appreciable amount of tuberculous disease in the other. I have known a cow so affected to become pregnant, but as a rule she is sterile, and the condition gives rise to absence of estrum or abnormal estrum with or without nymphomania. Two bullers on postmortem showed tuberculosis of both glands. This is not in accordance with the statements of some authors. Thus Zschokke ("Die Unfruchtbarkeit des Rindes") states that nymphomania seldom or never occurs under such circumstances.

Ovarian cysts are found in both mares and cows; cows and heifers are frequently sterile in consequence of this form of degeneration. In most cases one ovary only is affected, and for some unknown reason more often the right. They are single or multiple, superficial or deep seated, usually alone, but sometimes associated with persistent corpora lutea in the same or in the other gland.

Cysts are not uncommon in virgin heifers and calves, and they have been observed in animals a few days old. When affecting very young animals there are no symptoms to indicate their presence, the cysts are usually small and multiple, and the great majority appear to rupture after the advent of puberty; spontaneous recovery thus takes place. In old mares cystic degeneration of one or both ovaries is frequently met with and, as in calves, their existence may not be suspected during life. Bland Sutton (*Vet. Journal*, 1885, p. 46) says: ". . . . in fifty old mares taken at random, two-thirds possessed cystic ovaries, the cysts varying in size from a grape to an orange, and in number from three or four to a dozen."

In mares I have several times found the gland as large as a child's head, and in cows the size of a duck's egg or larger. The cyst in adult bovines varies from a cherry or walnut to a hen's egg; there may be very little ovarian tissue left, especially in old-standing cases in mares, atrophy and absorption taking place owing to the pressure of the fluid. Here the ovary is felt per rectum as a tense fluctuating sac in relation to the extremity of the uterine horn; its position may be altered owing to its weight and possible adhesions. The cow's ovary affected with deep or central cysts feels enlarged, smooth, firm, and rounded; firm compression of the gland is necessary to complete the diagnosis. The majority, however, are situated at the periphery; they are prominent on the surface, tense, fluctuating, thin-walled if recent, and easily crushed per rectum and per vaginam. The gland is nodulated and the shape and consistence are altogether different from the normal. In chronic cases the irritation and pressure of the cyst set up interstitial inflammation with induration and thickening of the gland. This also follows frequent operative handling especially when much force has to be used to press out the fluid. Lastly small cysts are sometimes present in the adjacent part of the broad ligament, and these must be included in crushing and spaying operations.

The incidence of cystic degeneration after parturition may be determined by periodic rectal examinations before and after the act; in such cases it is easy to demonstrate that the cysts are secondary to catarrhal or purulent conditions of the uterine mucous membrane. In the majority of instances, however, in my experience, their primary seat is in the ovary. At the same time it is well known that ovarian and uterine lesions frequently co-exist.

Symptoms

Ovulation seldom occurs in the diseased ovary, and in unilateral cases the sound gland may also be unable to perform its function: hence irregular estrum and sterility are common. Occasionally estrum is quite normal and the animal conceives readily. Both the frequency and duration of estrum are abnormal and in some instances it is absent. This form is more frequent in cows. It is also seen in persistence of the corpus luteum, atrophy, and chronic inflammation of the gland from any cause.

Markedly excessive and frequent estrum, known as nymphomania, is sometimes seen in virgin heifers, but most of my cases have occurred in cows between the fourth and

seventh calf, and in mares past middle age. The symptom is usually referable to chronic ovarian disease; it is seen also in affections of the uterus and cervix. Atrophy and sclerosis of the ovary in the mare may be accompanied by nymphomania.

Other general symptoms of genital disorder may be present, e. g., sinking of the broad (sacro-sciatic) ligaments on one or both sides; relaxation of the vagina and cervix, partial prolapse of the vagina, indurated and closed os, a discharge of thick tenacious mucus, or muco-pus, and signs of constitutional disturbance.

A fairly constant lesion of old standing cases is a chronic catarrh and thickening of the cervix, which may extend to the mucous membrane of the uterus. On palpation per rectum the uterus may be elongated and swollen, especially on the side of the affected ovary.

Therapeutics

Treatment is limited to operative handling of the ovaries by (1) periodic compression and massage; and (2) spaying. The latter is a last resource, but I have found it successful in restoring fertility in several cases in both mares and cows. Crushing per vaginam is the only safe method in old tough cysts, but in mares this cannot be carried out for anatomical reasons, and hence unilateral spaying is more commonly practised. Moreover the cyst wall is comparatively thick and less prominent than in the cow. The value of the mare, the chances of non-success, and the subsequent development of cysts in the sound ovary, militate against the spaying operation.

The method of handling cows by crushing the cysts cannot be recommended as a routine procedure except in valuable animals; the cysts frequently reform, and the repeated handling requires more time than the average practitioner can afford, or the average stock-keeper is prepared to pay for. This statement notwithstanding, good results are frequently obtained in recent uncomplicated cases, whilst a fair proportion of chronic lesions yield to treatment provided the necessary amount of time, attention, and patience are available. I have found it wise to examine the animal, and to repeat the operation if necessary at short intervals, say every four or five days. If left too long the ovary may be as large as ever, and no progress has been made. It sometimes happens that one handling, carefully and systematically carried out, is sufficient, but this is the exception, not the rule.

The technic is as follows: Secure by the nose, and place a man at the flank to hold the tail and keep the cow against the stall partition, pare and file the nails, and use a warm lubricating solution, like sodium bicarbonate or lysol, for the hands and arms; empty the rectum and allow the hand to lie passively in the bowel until straining and peristalsis have almost ceased, handle gently and pinch the back. Wash the vulva with a disinfectant, withdraw the hand in the bowel as far as the wrist, and introduce the other into the vagina in the usual way. Grasp the ovary per rectum and hold it to prevent slipping, whilst the fingers in the vagina exert the necessary pressure; then thoroughly rub or massage the gland between the thumbs and fingers to restore the circulation, and exert pressure on the cyst cavity for fifteen minutes or thereabouts. If there is only one animal to deal with, thirty to forty minutes in all may be spent with advantage.

In some virgin heifers the hand cannot be introduced into the vulva, and greater care must be exercised in crushing through the rectum on account of the delicate mucous membrane, and the readiness with which it is made to bleed. If the cyst is tough or deep-seated, it is best to massage the ovary, and try again two or three days later. After rupture a large hole is left proportionate to the size of the cyst. Only a small fragment of gland tissue may remain; on the other hand, the size may be little reduced owing to the presence of new connective tissue.

Persistent Corpus Luteum.—Here the yellow body which is formed after rupture of the graafian follicle fails to disappear; on the contrary it persists as a pathological condition, and it may attain a considerable size. On examining animals which have shown no estrum for many months one frequently finds soft or firm fleshy masses projecting from the ovary, which is nodulated

and enlarged. Sometimes a cyst is present in the same or in the other gland, and catarrh of the uterus may also exist. The latter, as in the case of cysts, may be primary and traceable to the previous parturition or abortion. One or several corpora may be found, the size and consistence of which vary from a hard pea-like nodule, difficult to dislodge, to a soft or firm fleshy mass, like granulation tissue, the size of a cherry or walnut.

Not uncommonly the growth protrudes from one end of the ovary like a man's thumb. The ovary assumes curious shapes, e. g., like a dumb-bell or Indian club and after operation very little tissue may be left. The yellow body may break up, but it frequently comes away whole, very easily as a rule, and leaves a considerable cavity. Estrum may be normal or nearly so, especially in the case of large bodies, and yet the animals fail to become pregnant.

Their surgical removal is carried out in the same way as cysts, except that there is some risk of hemorrhage and after straining, and more care has to be exercised. If the growth is not easily nipped off with the thumb and fingers, the ovary should be thoroughly massaged, and examined again some days later. The friction alone may suffice to restore the circulation, and normal estrum and impregnation may follow. As in cysts, it is advisable to repeat the manipulation after a short interval, although persistent corpus luteum does not recur so often. Estrum may appear four to ten days after the operation in dumb bullers; if there are no signs, examination should not be delayed, and fresh soft growths should be pressed out. Not until the second successive normal estrum should the animal be allowed to copulate.

The following case in a primipara is perhaps typical of its kind, except that more than one operation is usually necessary to stimulate ovulation and sexual desire: Jersey, had shown no signs of estrum since the first time she conceived, calved 15 months ago, two persistent corpora lutea in right ovary were removed, ovary and uterus massaged and artery compressed, time occupied thirty to forty minutes. Estrum appeared on the eighth day, again on the sixteenth, and then twenty-one days later. The next period being also normal, the heifer was served and became pregnant.

Precautions.—The growths are frequently very vascular, and some hemorrhage may occur unless the ovarian artery itself, or the whole ovary or its attached border, is compressed for some time after removal. Fatal hemorrhage is said to have occurred, but I have had no such unfortunate result. The experience gained in handling a large number of cases has convinced me that no bad results whatever need be feared if reasonable care is exercised. It is astonishing how much pressure the vaginal wall will stand with impunity; the ovaries, too, withstand a good deal of compression, although chronic interstitial processes may be set up, if not already in existence.

A record has been kept of several hundred cases of chronic ovarian disease which have been subjected to operative treatment; of these only three have shown untoward symptoms. A few instances of slight straining and slight hemorrhage per rectum are disregarded inasmuch as they soon passed off and were unaccompanied by any constitutional disturbance, nor was the secretion of milk impaired.

Case 1. Young cow, resented internal examination, strained violently before and after the operation, muscular tremors and arching of back continued more or less for twenty-four hours, some stiffness, and less milk. All right on the second or third day.

Case 2. Old cow affected with chronic purulent endometritis and cystic ovaries, appetite little impaired first day, dropped two quarts of milk and never rose again (treatment unsuccessful—medicinal and surgical).

Case 3. Heifer, first calf, persistent corpora lutea old standing, both ovaries; considerable pressure exercised, followed by severe straining and blood per rectum, fullness in upper flanks, and pain on pressure, stiffness, tremors of the muscles, blanched mucous membranes, loss of appetite and milk. Complete recovery within four days, milk secretion a little longer in reaching its former level.

Uterine Affections

The relative frequency of uterine disorders which cause sterility has given rise

to considerable difference of opinion. A recognized authority, Albrechtsen* of Denmark, holds the opinion that most cases of sterility in bovines are due to a catarrhal condition of the uterine mucosa. Hess,† on the other hand, found the proportion of ovarian affections considerably greater, i. e., ninety-two out of 127 cows or seventy-three percent. In 130 cows already mentioned I found lesions confined to the ovaries in sixty-seven cows or fifty-two percent; disease of the uterus alone, or uterus, cervix, and ovaries existed in fifty-one animals, or thirty-nine percent.

I have come to the conclusion that ovarian sterility in the cow, and uterine (particularly the cervix) sterility in the mare, are more frequently met with. It is very probably the case that slight cases of uterine catarrh are frequently overlooked; the slight swelling and congestion of the mucous membrane together with the extra secretion of mucus pass unnoticed, while the uterus may feel normal in size and consistence on palpation per rectum; more often, however, it is moderately swollen, more marked in one horn than the other, and firmer than usual. In addition the mucous membrane of the cervix may be affected, especially in mares, associated usually with relaxation or stenosis.

Of ninety-seven cows examined after death at the Copenhagen Veterinary School under the direction of Prof. Bang, sixty-four showed lesions in the genital organs; of these no less than fifty-eight were affected with endometritis, while a small number only showed lesions in the ovaries and other parts of the genital tract.

Experience teaches that conception may take place in spite of slight uterine catarrh; nevertheless abortion may result during the first few weeks of pregnancy, owing to the inability of the embryo to attach itself firmly to the altered mucous membrane. The various forms of metritis and endometritis arise from similar causes. The virulence of the infecting organisms and the powers of resistance possessed by the individual are the factors which determine the nature and extent of the pathological changes. It is thus only a matter of degree.

Vet. Jour., 1910, p. 123.

†*Vet. Jour.*, 1910, p. 73.

While normal parturition and expulsion of the afterbirth may be followed by endometritis (owing probably to faulty involution) the majority of cases follow wound infection in dystokia, twins, abortion, and retention of the placenta. The latter is the most fruitful cause; moreover, more cases follow abortion than full-term births. Early death and maceration of the fetus, or retention of a portion of afterbirth at a later stage of pregnancy, as a prolific cause of pyometra. Crude attempts to open the closed cervix of the mare may introduce organisms which set up purulent conditions of the uterus.

Chronic affections may result from acute, but more commonly they assume a mild or chronic course from the outset, and their existence may not be determined or suspected until some time after parturition. Thus in chronic purulent endometritis the animal may show some straining for a few days and a purulent discharge of varied character; this becomes intermittent and then ceases, or appears to cease, only to reappear at the first estrum. The estrum may be normal, more often it is decidedly irregular. Copulation takes place periodically without result, and rectal examination reveals a swollen elongated uterus, more apparent in the horn which was pregnant; the organ is firm, sometimes indurated, less often nodulated. The cervix is usually closed between estral periods and the discharge collects during the intervals. In slight catarrhal conditions, on the other hand, there may be little or no swelling but the vagina and os are frequently relaxed, and the mucus, always excessive in amount, may give an acid reaction. Further, extension may take place to the vaginal mucous membrane, which is redder and moister than normal.

General symptoms may be absent, but in other forms there is more or less loss of condition and unthriftiness, the foal does not thrive, and the cow's milk yield is distinctly below par.

In chronic metritis and pyometra in the mare and cow purulent fluid accumulates, sometimes to a considerable extent, the amount depending on the state of the cervix (often closed and thickened) and the manner and virulence of the affection.

The walls of the uterus are paralyzed and more or less thickened, indurated, and rough so that contraction cannot take place. In mares the os may be quite hidden on vaginal palpation, and the distended uterus presses the anterior vaginal wall backwards. The contents are discharged at considerable intervals when the pressure is sufficient to bring about dilation of the os; a discharge also takes place if estrum occurs.

Collections of fluid are said to occur in animals that have never been bred, but this is very doubtful. It is more likely that such animals have become pregnant, and abortion or death, and maceration of the fetus has occurred in the early stages of gestation. I have met cases of this kind in heifers which were thought to be in calf owing to absence of estrum after service. In the various forms of pyometra the uterus on rectal palpation feels like a shapeless bag filled with fluid, it is tense, there is distinct fluctuation, and it may be difficult to distinguish the horns and impossible to reach the ovaries, the latter are tucked underneath the distended body. If there is less fluid the relation of the different parts can be readily determined. The vulva is frequently very small in young heifers, and the patency or otherwise of the cervix cannot be made out by rectal examination alone. After handling the internal organs uterine contractions are frequently set up, and these bring about dilatation of the cervix and vagina, permitting the hand to enter the vagina and the insertion of the finger into the os.

The character of the fluid varies greatly; in the mare it may be a dirty grey color, or slightly yellow, thin and occasionally sanious. The cervix also is frequently thickened and distorted, and the mucous membrane is ulcerated or denuded of its epithelial covering like the uterus. The fluid may be odorless or fetid in either animal. In cows a fetid odor is usually associated with the presence of bones or other portions of a fetus, or with a fragment of afterbirth. The fluid also may consist largely of mucus or serum or both. These conditions in themselves cause sterility in various ways: (1) Estrum is absent or irregular. (2) Copulation if it takes place is not followed by conception. (3) Abortion follows at an early stage if the animal happens to become pregnant.

Secondary lesions often appear in other organs—occlusion of the oviducts, abnormal conditions of the cervix, disease of the ovaries, and catarrh of the vagina. These complications may cause absolute sterility.

Therapeutics

The prevention of sterility resolves itself largely into a thorough understanding and avoidance of the various causes already mentioned. In the actual handling of barren animals, however, effects rather than causes have to be dealt with. Two remarks may be made here in relation to prophylaxis: (1) Puerperal infection is responsible for most diseases of the uterus, and it is due to sepsis. (2) The organisms are nearly always introduced from without, and they find a favorable environment in the puerperal uterus.

Hence the necessity for removing the retained placenta, preventing infection, and aiding normal involution on which so much depends.

Medicinal treatment is sometimes a useful adjunct in diseases of the uterus, but reliance must be placed mainly on the direct operative handling of the affected part or parts. In mild catarrh it may suffice to douche the vagina with a warm non-irritating antiseptic; if the os is permeable the uterus should also be washed out. A one-percent solution of sodium bicarbonate is frequently used for this purpose, and it answers very well. Cubebs, nux vomica, and large doses of sodium bicarbonate may be given internally, or nux vomica and iron. Ovarian lesions require handling, while attention to the general health and the avoidance of sexual excitement are called for.

Chronic purulent endometritis, true metritis, and pyometra may be classed together in both mare and cow. The main indication is to overcome sepsis by removing morbid products and setting up healthy action. To attain this object preliminary dilation of the cervix is freqeuntly necessary in order to secure good drainage from, and free access to, the cavity of the uterus. In the mare this is a comparatively easy

task; not so in the cow, for anatomical reasons. In either animal the fingers of the operator are preferable to any instrument.

The method is safe, fairly rapid, and unlikely to be followed by laceration of the tissues if sufficient patience is exercised. Tents of seaweed or gum, graduated bougies, gauze plugs, and branched metal dilators are sometimes used in both medical and veterinary practice. Tents have proved useful in cows when they could be introduced, but I have relied mainly on digital dilatation, assisted when necessary by hot vaginal irrigations, massage of the uterus, and pressing out persistent corpora lutea. The latter operations not infrequently stimulate the contractions of the uterus on which natural dilatation of the cervix depends.

The white alkaloid of hydrastis canadensis (hydrastine) has also proved of service, not only in dilating the os, but in assisting the distended uterus to return to its normal volume. It may be necessary and it is not difficult, to seize the os with a long strong pair of vulsellum forceps or a double hooked retractor, or both, insert a speculum, and draw the os back towards the vulva. A metal catheter enclosed in a rubber tube of small diameter is then introduced into the uterus. Once the uterus is filled with fluid the dilation of the os is easily completed with the fingers, until the whole hand can be introduced in the mare.

For intrauterine irrigation, a rubber tube three-eighths of an inch in diameter and ten feet long can be recommended, or a thick rubber catheter with holes at the end to spray in all directions. Mechanical flushing is first carried out with gallons of salt solution (two drams to a pint of water), plain boiled water, one percent sodium bicarbonate, or a weak antiseptic. For this purpose I prefer warm salt solution.

The uterus is completely filled so that every portion of mucous membrane is cleansed, the fluid is then removed, syphoned off if necessary, and the process is continued until the fluid is quite clear. Any reliable non-irritating antiseptic may then be introduced.

In chronic purulent affections of the uterus I have had best results with Lugol's solution or sulphate of copper, alone or alternated; one-half of one percent iodine and three-fourths of one percent copper is the strength I have employed as a rule. Chinosol and lysol are also good, the latter in three-fourths to one percent solution. Peroxide of hydrogen is excellent, especially if there is much fetor. The irrigations should be carried out by the veterinary surgeon himself, daily, or several times a week according to the case.

The uterus is finally emptied, and a good antiseptic pessary may be inserted, e. g., iodoform and boracic acid, saloform, bacillol, chinosol. Hydrastine may be used internally in two-grain doses twice daily, and locally together with iodine, carbolic acid, glycerin and ichthyol. Certain cases have also derived benefit from the administration of ovarian sedatives (so-called) with hydrastine, particularly cases of nymphomania, due to disease of the uterus and ovaries.

Any beneficial action which they may exert is probably in the direction of abating the chronic irritation and congestion of the genital tract, whilst operative treatment is being carried out. I have also used cannibis indica for the same purpose.

Aphrodisiacs are frequently used in slight or suppressed sexual desire; they usually succeed in irritating the genital tract, aggravating the causal lesion, and in setting up a kind of false estrum, without increasing the animal's fertility. Nevertheless, in well selected cases, they have their place, although their employment is seldom indicated.

Diseases of the Cervix

Sterility in mares is largely due to a thickened, distorted, or closed state of the cervix, hence the success which attends the indiscriminate practice of the operations known as "opening the womb" and "artificial insemination." Lesions may or may not be confined to the cervix; if not, these operations usually fail. In cows, in my experience, disease of the cervix is relatively infrequent, and certainly uncommon as a primary condition. Ovarian or utero-ovarian lesions usually co-exist. This is probably one reason why insemination is much less successful in cows than mares;

another is that the os is much less permeable, and difficulty may be experienced in introducing the instrument into the uterus.

This simple operation is practised by some unqualified persons on every barren mare which comes into their hands. No attempt is made by internal palpation or other means to ascertain the cause. Occasionally it happens that conception follows, even when the cervix and vagina are normal; in such cases copulation would have been followed by the same result. Ninety percent of selected mares in my hands have become pregnant after the first or second insemination; in these cases artificial means were indicated; on the other hand a number of mares with various genital disorders or systemic disturbances have been inseminated from time to time with indifferent results, needless to say at the owners' request. It is well in such cases to explain the nature of the lesion when it can be ascertained, and the indications for and against insemination.

It is advisable to make two examinations, the first during estrum, the second later on, both per rectum and per vaginam. Also to observe the act of coition and the animal's subsequent behavior, and to test the reaction of the vaginal mucus. In doubtful cases the os may be fixed and drawn toward the vulva. A reliable history is also of great assistance making a ccrrect diagnosis in these cases.

In most animals, if not in all, a straight open cervix appears to be necessary to natural fecundation; this is especially the case in mares. Two opposite conditions are met with in both species: (1) Stenosis, partial or complete. (2) Relaxation.

Stenosis is more common in mares; the canal is frequently crooked, curving often downward and to one side, more often in my cases to the right. The cervix is usually longer or shorter than normal, indurated and more or less thickened, the mucous lining may be swollen and ulcerated, and granulations or fringes of mucous membrane may obstruct the os. Furthermore, one side of the cervix is often thicker and harder than the other, and the os is pushed to one side or hidden altogether. Little or no natural softening or dilation occurs at estral periods. These lesions frequently follow injuries received during parturition; interstitial changes occur with irregular deposition of fibrous tissue, contraction, and deformity. Stenosis occurs rarely as a congenital condition in virgin mares. Tumors also sometimes obstruct the os.

Relaxation of the cervix is associated with swelling and congestion of the mucous membrane, and a chronic mucous, mucopurulent, or flocculent discharge. The os is wide open and flaccid, catarrh of the uterus and vagina is often present and estrum is abnormal. Both mare and cow are thus affected.

Therapeutics.—The cervix is treated on similar lines to the uterus. Dilatation should be carefully and gradually carried out with due regard to antiseptic technic and swabbing with peroxide of hydrogen, may be followed by the application of nitrate of silver or tincture of iodine. A six- to ten-percent solution of nitrate of silver (30 to 48 grains to the ounce) is a useful dressing if the mucous membrane is thickened and ulcerated, preceded if necessary by pencils very lightly applied. Loose fringes should be removed with a pair of long scissors after drawing the os backward. The curette is sometimes useful. If simple stenosis exists the mare should be covered as soon as the digital dilatation has been completed. A one or two-percent solution of sodium bicarbonate can also be recommended as a vaginal douche immediately or sometime before copulation takes place.

Veterinary Education in Holland

By LLOYD CHAMPLAIN, B. D., D. V. S., Kansas City, Mo.
Secretary, The Southwestern Guernsey Breeders' Association

"WAAR is de Veeartsenijschool?" might not have been the best of Dutch but it was the question I put with what I though proper and polite Dutch trimmings to nearly every one I met in Utrecht until I was steered through the big gate-way into the midst of things veterinary.

The veterinary college was my goal at Utrecht. The information I might obtain here was the only honest excuse I could give the police for tramping into this city. Its position on the map would have led me hither in search of the Maas-Rijn-Ipel cow, but I had learned from men acquainted with the animal husbandry of the country that this breed was being propagated much farther to the east and south of east. My observations thus far in the southern provinces of Holland had not disclosed any great interest in the husbandry of pedigree and type. Utrecht, in this respect, belongs with the southern provinces. It was therefore the college—heart of the veterinary life of Holland—that brought me here.

Walking along the street with its almost solid wall of business fronts on either side one would likely pass the college while in search of it. So inconspicuous is its veterinary aspect that one is quickly impressed with the guess that it is not advertising for business. Once inside, the capaciousness of its grounds and buildings differentiates it from commercial enterprises and gives the suggestion of wealth, ampleness and reserve.

I was not left to wander about alone and

Castration in Utrecht

Principal W. C. Schimmel stands on the left near the corner of the mat wearing a stiff hat which is the first stiff hat beyond and to the right of the cap that sits on the head of the man nearest you on the left. Now, this cumbersome description is not because I could not have made a mark on the print to identify the Principal, but because I wanted to make you look at that picture until you get some proper conception of the personnel of that bunch. I need not mention the spotless coats, well groomed heads, intellectual poise, tasty dress, splendid physiques, general evidence of culture and force—all these are plain enough. Notice cause here for my gratitude that these men did not spoil my picture by "posing"—their attention to the matter in hand augmented my admiration.
The gentleman on the right in street dress is A. vander Laan a student whose understanding and use of English acquired in Holland schools surprised me happily. Mr. vander Laan's reason for appearing at this scene without a clinician's coat was that he was assisting me in a study of the college.

ask questions at random. It is not the way of this institution to let strangers lounge around the premises. When one approaches the entrance it is supposed—and why not—that he is there for some purpose, and that if that purpose be legitimate and proper, that it can be best served by cooperation with those in charge, and a sense of courtesy prevails that brings men as great Americans. You will not have occasion here to feel that you are being accompanied as a suspect, but as a student. The spirit of openness and freedom so pervades the institution that you will almost forget that you are in Europe.

Principal W. C. Schimmel received me in due course of passage and invited me, casually, to go with him to the scene of a

POISONOUS AND FOOD PLANTS, UTRECHT VETERINARY SCHOOL

This garden is contiguous with that part of the campus where the animals are housed in the rear. It is not maintained for beauty but utility. The white rectangular spots seen everywhere through it giving it some resemblance to a cemetery are well prepared boards bearing the names of the grasses by which they stand. The person in the garden is Mr. A. vander Laan, and it was to please me and not himself that he became a part of the photograph.

the visitor, in very proper course, to the managing personnel of the institution. In this Utrecht shares the courteous as well as the conservation spirit of Europe. I should call attention—from point of fairness as an American would regard it—to the greater degree of democracy here than at some other veterinary institutions of learning. It might have been better had I said: a lesser degree of militaryism. Indeed if you should visit here after having been brought up several times quite abruptly to the point of "attention" you will be impressed with the good quality of the guess you may have already made, while traveling in Holland, that the "Dutch" element of early American immigration is to be credited with much of that admirable democracy that has caused us to speak of castration, remarking that he was just getting ready to go over.

Out on the clean sod beside the main driveway of the campus without a shadow to prevent the disinfecting power of the sun, and nothing overhanging to scatter germs were a party of white-coated men. The mats were being brought and following them the subject, which was a "straight" horse. I had observed that the operating table is not as popular in Europe as it is in America, though this was an ordinary castration as much care was exercised to avoid infection—so it seemed to an American—as if the operation were to lay open the abdominal cavity. Not only was the field thoroughly cleansed with soap and water and stronger disinfectants before the incision, but carefully cleansed and anti-

septically packed afterwards. For this, complete anesthesia was induced, and I understand that it is in vogue in what we would term much simpler operations.

Among the features of equipment which elicited my rather special interest—for I was in the "milky way," as you know—was the stable of cows. These cows were kept to supply the needs of such patients as might need their products; to furnish milk for laboratory work; to serve as subjects, if desired, for demonstration in "Feeds and Feeding," "Breeds and Breeding," "Anatomy" and what not. Here, Mr. A. Vander Laan, explained the markings and physical signs of the fries—Hollandsch ("Holstein-Friesian" in America) Groninger Blaarkop ("white head," that last word means, but they are no kin to the "white faces") and the Maas-Rijn-Isjel breeds. These are the native breeds of Holland. I would like to tell you about these breeds as I saw them but that might not be just the right thing in the AMERICAN JOURNAL OF VETERINARY MEDICINE.

Another feature of the equipment that enthused me was the garden—not a kitchen garden; and I cannot call it a garden of poisonous plants because it contains more than the plants of Holland that are poisonous to live stock—there are all the plants and grasses of food value that the veterinarian may know.

Shall the bust of Thomassen be alluded to as a feature of equipment? Shall his name, which is on every tongue, his career, which is indelibly stamped in every memory, be counted assets or equipment? Well, be that as it may the bust is there and you must see it—they want you to see it and you cannot understand what you see at this college unless you get the vision of this man's life as they have it.

(*Continued on page 166*)

DR. LEWIS W. FETZER

Dr. L. W. Fetzer, editor of our abstract department, has been appointed associate professor of Physiological Chemistry in the Medical Department of Georgetown University. He will continue his work in the department of Agriculture and his editorial work for VETERINARY MEDICINE.

DR. LEWIS W. FETZER

Doctor Fetzer receives at his office every veterinary publication in the world and the report of the agricultural experiment stations of all nations. He reads and digests the whole and supplies the best of it for readers of VETERINARY MEDICINE each month in the "World's Work Department." It has been said of Doctor Fetzer that he can read a greater number of languages than he is years old.

The assurance which readers have of the accuracy and absolute reliability of Doctor Fetzer's abstracts is one of great satisfaction. How easy it is for a confusing error to slip through in work of this kind is shown by an occurrence of this nature in the *American Veterinary Review* for December last about which more than one subscriber has written us. The reference is to page 350 where equine influenza is referred to as "murrain" and page 352 of the same issue where dourine is spoken of as "contagious abortion."

Murrain being, in this country, a lay term applied to various ailments of cattle, and the knowledge being general among readers of VETERINARY MEDICINE that the Trypanosoma equiperdum is not the cause of contagious abortion, made so patent the error in the abstracts referred to, that probably no one was misinformed by them.

The abstract work in VETERINARY MEDICINE has proved of great interest and unexpected value to experiment-station veterinarians and other research pathologists. The abstracts of veterinary literature which appear in the *Experiment Station Record* are of necessity delayed for several months after their original publication, and in VETERINARY MEDICINE alone are they distributed to English-reading veterinarians never more than one month subsequent to their original publication. Veterinary practitioners for whom this department is especially prepared have read it enthusiastically from its inception.

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Kansas Veterinarians and Their Legislative Troubles

HOPE springs eternal" in the breast of Kansas veterinarians. On no other assumption can be explained the optimistic view which they took of the treatment they expected their present state legislature to accord them.

At their annual meeting in January their hopes were high that the Kansas Veterinary Practice Act might be made more stringent and improved in various ways; that the examination of stallions might be placed exclusively in the hands of graduate veterinarians and the fee raised from $2.00 to $5.00, and that the fee for tuberculin testing for the state might be raised from $5.00 to $10.00 per day. In addition to this they made a strong effort to, and apparently had hopes of succeeding in, having the live stock sanitary control taken from the hands of laymen and placed under veterinary supervision. But they reckoned not with the political forces of the state. It appears that the Live Stock Sanitary Commission will remain a political office; that no change will be made in the stallion examination nor tuberculin testing, and there will be no increase in the fees allowed for this, and so far from *improving* the veterinary practice act, they have been practically forced to consent to an amelioration of its provisions to save it from being repealed altogether. And now comes the worst blow of all: the State Board of Pharmacy, under the pretense of securing authority for the inspection of drugs used within the state, has had presented to the legislature a law, which, if it is enacted (and it has powerful forces behind it), will practically prohibit veterinarians from dispensing any drugs to their clients or even preparing them for use in their own hospitals, except by the prescription route, and a strict construction placed upon the law would prevent them from filling their own prescriptions. In other words, the veterinarian may go to see a case, if he gets the opportunity, may diagnose it, if he is able, but if medicines are needed he must write a prescription which only a licensed pharmacist can fill, and then when the owner returns with the medicine, the veterinarian, or any one else, can give it. Doctors of human medicine are permitted to give emergency treatment and report the prescription to the Board of Pharmacy later, but no such privilege is specifically given to veterinarians. Furthermore, the State Board of Pharmacy is authorized and di-

rected to make uniform "rules and regulations" which shall have all the force of statute laws and the violation of which is punishable by fine or imprisonment or both.

No restriction is placed upon the druggist who sells proprietary remedies over his counter to the farmer, who has diagnosed his own case.

It need hardly be said that pharmacists and their representatives are not inclined to be judicial in their dealings with disensing veterinarians or physicians, whom they regard as trade interlopers and whom by resort to legislation they have repeatedly sought to force to prescribe.

With the dispensing doctor and his drugs left to the mercies of the pharmacist, what can he reasonably expect? Tender consideration?

The measure, which is known as House Bill 592, has progressed very quietly to the present stage and no protest, so far as we know, has been made by any Kansas veterinarian. Needless to say Kansas veterinarians do not object to the proper testing of their drugs, but we know they do object to having something "put over" without an opportunity for a full understanding of its provisions or an opportunity to file a protest if they have cause for complaint. We advise every Kansas veterinarian to write his legislator *at once* to hold up this bill until it can be discussed in detail. In its present form it theratens the very life of veterinary practice in the state.

MORE PAY FOR VETERINARY INSPECTORS

In the Agricultural bill, as reported to the House of Representatives, there is appropriated $17,593,275 to carry on the business of the Department of Agriculture for the fiscal year beginning June 30, 1913. Of this amount, $1,969,696 is for the Bureau of Animal Industry.

This bill allows the Department of Agriculture $1,000,000 more than was appropriated for its use during the current fiscal year and of this increase the Bureau of Animal Industry gets a large share—approximately $300,000. Its appropriation for the current year being $1,670,316. The Chief of the Bureau, Dr. A. D. Melvin, asked for an appropriation of $2,128,046 for next year but this was cut down $158,-350 by the House Committee on Agriculture.

What reductions, if any, Congress may make in the amounts recommended by its Committee on Agriculture, of course are unknown; but at present the chances that Veterinary Inspectors in the Federal service will receive some of their long-delayed and longer -merited increases in salaries, appear good.

AMERICAN VETERINARIANS TO ATTEND THE LONDON CONGRESS

Through the kindness of Dr. L. Van Es of Fargo, North Dakota, we are enabled to give in this issue an abstract of the proceedings of a recent meeting of the Permanent Commission of the International Congress of Veterinary Medicine.

At this session, August 3 to 8, 1914, was determined upon as the date for the next meeting of the International Congress of Veterinary Medicine, which will be held in London, England. This will be the tenth meeting of the Congress and the fiftieth anniversary of the first meeting and it will be the first meeting ever held in an English-speaking country. Because of this and because the proceedings of the meeting are largely in the language of the country in which it is held, the next Congress offers unusual attractions for the attendance of American veterinarians, and the representation from this country should be large. It is none too early to begin to plan for this. If the matter is handled properly the number who go from America should reach two hundred. A committee to represent the A. V. M. A. at this Congress should be selected at the meeting in New York next September. This committee should consist of a member from each state and territory of the United States and one from each province of Canada and also a representative from the military service of each country and one or more from the Federal meat inspection and quarantine service.

If the representatives on this committee

from the states and provinces are chosen from veterinarians in the service of their respective states and provinces and the men are properly supported by the A. V. M. A. organization, nearly every member on this committee should be able to get from his employers the expenses, incident to attending this Congress and of course his salary while attending. This alone should guarantee an attendance of seventy-five from the United States and Canada.

Coming as the Congress does during the school vacation the twenty-one veterinary colleges in America may reasonably be expected to have at least fifty representatives at the London meeting. This leaves but seventy-five of our estimated two hundred to be made up of practitioners and others, who have long expected to visit Europe and because of the London Congress select this time, of those who go to Europe every summer for pleasure or instruction, or in connection with the purchase of stallions or other pure-bred animals and who will arrange to attend the Congress while there, and members of the Royal College of Veterinary Surgeons (of whom there are seventy in America) who of course will find many attractions at this Congress.

This estimate will not appear large when it is remembered that veterinarians from the eastern states may attend this meeting at very little greater cost in time and money than will be required of those from the Pacific states who attend the New York meeting of the A. V. M. A. and these states are certain to be represented at the latter meeting.

DO YOU WANT INFORMATION ON CANINE PRACTICE?

There is no veterinary journal published in English which gives any considerable attention to canine medicine, canine surgery or the problems of canine practice. Yet this branch of veterinary practice is a lucrative one of ever-increasing importance. It offers attractive opportunities in many localities and the increase in the number of automobiles does not affect it. The number of veterinarians who make a specialty of dog practice is increasing from year to year and the number who give greater or less attention to this phase of practice is much larger than it was a few years ago.

For these reasons it seems that a special department in VETERINARY MEDICINE might well be devoted to a discussion of dog and cat practice and its problems. We have an opportunity to secure a competent editor for such a department, one who knows small animal practice as few know it, and who has ability to tell what he knows in a plain concise manner. It is up to our readers to say whether or not we shall include such a department in VETERINARY MEDICINE. If you want it say so, and say so quickly. If we do not hear from you we will assume you are not interested.

This department, if we do establish it, will be devoted in part to a systematic discussion of the whole subject of canine diseases and surgery (including feline medicine and surgery also). This will be run as a continued article, completing the subject in something more than a year. The remainder of the department will be given over to discussions by the readers, to queries and their answers. Our cynologist knows his subject from A to Z and will be able to give you some valuable, expert advice as to the diagnosis and treatment of puzzling cases.

But remember, the decision *lies with you*, we shall not start this department unless there are at least two hundred requests for it within the next two weeks. If we get these requests we will begin with the April issue and devote from three to eight pages monthly to this discussion. The general discussion will be new throughout and eminently practical for the ordinary practitioner with a ban on "dry-as-dust" matter.

A PERMANENT SECRETARYSHIP FOR THE A. V. M. A.

Elsewhere mention is made of the fact that the International Congress of Veterinary Medicine has established a secretary's office permanently at the Hague. The international congresses of medicine, pharmacy, hygiene and demography also have permanent offices at the Hague. This action recalls the reasons that VETERINARY MEDICINE has given more than once why the A. V. M. A. should have a permanent

office and a secretary who devoted his whole time to the business of the Association.

Such an office should be in a large city and of course centrally located, and that means Chicago, when the distribution of the members of the veterinary profession is considered. For reasons that have been given before, the secretary should be elected for a term of at least five years (and be subject to recall). Shall we follow the lead of the International Congress of Veterinary Medicine and allied sciences and establish a permanent headquarters?

CONNECTICUT ANALYSES PROPRIETARY REMEDIES

In Part II of The Annual Report of the Connecticut Agricultural Experiment Station, New Haven, may be found the analysis of various proprietary remedies, including the following: Hydrozone, Gourand Oriental Cream, Spiro Powder, Poslam, Dr. Franck's Grains of Health, Dr. William's Pink Pills for Pale People, Kargon Compound, Schenck's Pulmonic Syrup, Thialion, Ely's Liquid Cream, Cubanos, Dr. Pierce's Golden Medical Discovery, Peruna, A. D. S. Rheumatic Remedy, Rheumatogen, Sanatogen, and Pinex.

These make a very poor showing in the hands of the state chemist who finds the trade-mark in most instances to represent from nine-tenths to forty-nine fiftieths of the selling price of the preparations, i. e., the same ingredients may be obtained at the market price for from one-tenth to one-fiftieth of what is asked for the "remedy" by the proprietary companies.

STREPTOCOCCIC HEMOLYSIN

On the hemolysin produced by pathogenic streptococci, and on the existence of anti-hemolysin in the serum of normal and immunized animals. J. W. McLeod (Jour. Path. and Bact. [Cambridge] 1912, Vol. XVI, No. 3, pp. 321–350).—By using the methods described in this paper it is possible to obtain constantly from cultures of certain streptococci filtrates containing an active hemolysin.

The amount of hemolysin which a streptococcus produces in any medium is approximately proportional to the extent to which that medium favors its active and protracted multiplication.

Streptolysin is destroyed by exposure to a temperature of 50°–55° C. for thirty minutes. In this respect it closely resembles tetanolysin, staphylolysin, and megatheriolysin. It deteriorates rapidly on incubation at 37° C.

There is no evidence of the formation of hemolysoid as a result of the artificial or spontaneous weakening of streptococcal hemolysin.

In the case of the four species of animals examined—man, horse, rabbit, and guinea-pigs—there is very little variation in the amount of anti-hemolysin contained in the serums of different animals of the same species.

The normal anti-hemolysin to streptolysin in horse serum is apparently not globulin or albumin, but is possibly lipoid.

No trace of immune anti-hemolysin is found in the serum of rabbits or guinea-pigs which have been treated with large injections of streptolysin during a period of seven or eight weeks, nor is any found in the serum of men who have suffered from infections due to hemolytic streptococci.

Virulence and hemolytic power are closely associated amongst pathogenic streptococci.

L. W. F.

VETERINARY EDUCATION IN HOLLAND

(*Continued from page 162*)

The student-roll numbers about one hundred fifty, being varied a little either way by the difference in the incoming and outgoing classes. It is possible to complete the course in four years, but five or six years are more often required, or, perhaps I should say devoted. The student is protected, and the country safeguarded, by the law that only men hwo have been educated and approved by this national college can practice veterinary medicine in Holland.

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EDITOR'S NOTE.—A life sketch of Thomassen by Dr. Champlain will appear in an early issue.

WORLDS WORK in Veterinary Science

A digest of all the Current Literature of Comparative Medicine

By Dr L. W Fetzer Washington. D.C.

THE relation of the Bacillus Voldagsen to hog cholera. W. Pfeiler (Berlin. Tierärztl. Wochenschr., 1912, Vol. 28, No. 36, pp. 667–668).—Classical hog cholera could be produced when young pigs were fed with the Bacillus suipestifer (Bacillus Voldagsen). The disease so produced could be transferred by cohabitation and all the infected animals died. In addition to the above tests three animals were immunized with antihog-cholera serum, two others were immunized against the B. voldagsen, and one animal free from hog cholera was fed with the B. voldagsen. In the course of a few weeks the pig fed with the B. voldagsen and those immunized against hog cholera became sick and died. The animals immunized against the B. voldagsen remained alive. The above findings are contrary to those obtained by Haendel and Gildemeister.

—

THE ultra filtration of the filterable (hog cholera) viruses. L. Von Betegh (Berlin. Tierärztl.,Wochenschr., 1912, Vol. 28, No. 52, p. 969).—The virius of hog cholera (heart blood, emulsions of spleen, kidney and lung tissue) after being filtered through a Bechhold disc collodion filter did not produce hog cholera when injected into young shoats. Evidently the viruses we usually call filterable are not filterable at all, and is entirely dependent upon the filter used. The unfiltered virus contained strongly refracting bodies and spirochete like organisms. The unfiltered virus when cultivated on agar showed coli and bipolar bacteria and organisms resembling the B. suipestifer.

—

STUDIES on the virus of hog cholera. W. E. King and F. W. Baeslack (Journ. of Infectious Diseases, 1913, Vol. 12, No. 1, pp. 39–41).—The blood of hogs affected with cholera and from normal hogs was examined with the dark field illuminating apparatus and in every instance the blood from the diseased animals had present an actively motile spirochete five to seven microns long and one micron in width. Permanent mounts have been made with the viruses from the U. S. Bureau of Animal Industry, Indiana and Rochester.

—

THE relation of the Bacillus voldagsen to hog cholera. L. Haendel and Gildmeister (Centbl. Bakt. [etc.], 1. Abt., Ref., 1912, Vol. 54, Beiheft, pp. 78–83).—This shows that the B. voldagsen (previously termed Bacillus suipestifer Voldagsen) when taken directly from the animal will agglutinate pestifer and paratyphoid sera. In the tests there were five serum animals, three animals infected with hog cholera virus, four infected with the B. voldagsen, one animal which had recovered from an attack of the virus fed with the B. voldagsen, and six untreated animals. Of these nineteen animals, five which were treated with serum and one of the untreated animals were alive at the end of the experiment. The fact that the untreated animal is alive is explained by the use of a very weak hog cholera virus. The remaining thirteen animals died after being in the stall from three to four weeks. The bacteriological examination of the cadavers of these animals showed the following: Five experimentally infected with the B. voldagsen showed the presence of B. voldagsen; one infected with hog cholera virus, B. voldagsen; two infected with hog

cholera virus, B. suipestifer, and B. voldagsen; two untreated animals, B. voldagsen and B. suipestifer; three untreated animals, B. suipestifer. Summarizing, ten out of thirteen animals showed the presence of B. voldagsen.

—

AGGLUTINATION in dourine, beschälseuche, nagana, and other diseases with special reference to the staining methods and the morphology and biology of the causative agents. W. Mattes (Centbl. Bakt. [etc.] 1. Abt. Orig., 1912, Vol. 65, Nos. 6–7, pp. 538–573, figs. 8).—The conclusion reached in this investigation is that agglutination occurs with trypanosomes. Normal sera agglutinate in titers of 1:100 while immune sera agglutinate in titers of 1:12,000. The serum of cured animals agglutinates higher than a normal serum, and even a long time after no vestige of the disease remains.

Radioactive substances raise the agglutinating titer. The reaction is not specific; it is a group reaction.

—

A BLOOD disease which has not been investigated (Dir. Klepp Potsdam Abattoir. Zeitschr. f. Fleisch-und Milchhygiene, 1912, Vol. XXII, No. 10, pp. 302–303).—A steer came to slaughter who showed no evidences of disease during life on necropsy showed a spleen of twice the usual length and breadth and enlarged otherwise. The color of the spleen was almost black, and tar-like and pasty blood exuded from it when cut. The spleenic tissue, however, had a firm and pretty normal consistency. The liver was blackish-brown, but not hard and brittle. Likewise the kidneys were much darker than normal. Lymphatic glands were normal. Anthrax and piroplasmosis were excluded. The animal was of first quality and weighed about 2200 pounds when slaughtered.

About two months later two animals were noted having the same pathologic condition.

All bacteriologic tests gave negative results.

—

IN REGARD to the presence of teniolysins in immune sera obtained by treatment with suspensions of tenia. Sivori, Corradi, and Caffarena (Ann. Ist. Maragliano, Vol. 5, Nos. 1–2, pp. 97–103).—In the sera of subjects infested with tenia solium specific antigens were noted in addition to specific antibodies. For this purpose a certain number of proglottids were rubbed up with glass sand and suspended in a physiological salt solution. The suspension was kept in the refrigerator for twenty-four hours and then filtered. With this antigen rabbits were immunized and they yielded a serum which gave a precipitate on the addition of tenia emulsion. Some further work is to be done in regard to diagnosing the disease by these methods.

—

EXPERIMENTAL investigation in regard to the toxemia of pregnancy. K. Grube and K. Riefferscheid. ([Physiological Institute of the University of Bonn.] Med. Klinik, 1912, Vol. 8, No. 14, pp. 569–571).—This preliminary announcement shows that an ether extract of the blood of pregnant rabbits injected shortly before or shortly after parturition is very toxic: An alcoholic extract is not toxic. The ether extract produces paralysis, spasm, a gradual marked lowering of blood pressure and then death. The ether extract from the blood of nonpregnant animals was not toxic for other rabbits but while the ether extract from the blood of pregnant rabbits was also toxic for nonpregnant rabbits it was not toxic for animals late in pregnancy.

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THE USE of intraperitoneal injections of chloral for anesthetizing horses. Lemire and Ducrotoy (Revue Vet. Militaire, 1912, No. 3, Berl. Tierärztl. Wochenschr., 1913, Vol. 29, No. 1, p. 6).—The solution of chloral to be injected is held in an irrigating or other appropriate flask having a rubber tube (bore 1.5 to 2 mm.) to which is attached a trocar and cannula. The trocar is now pushed slowly into the left supra illiac fossa until no resistance is felt. As soon as this is noted the trocar is pulled out from its sheath (cannula), the bottle is raised and the chloral solution flows into the abdominal cavity.

The highly satisfactory results which the authors have had with this method prove that it can be conducted without danger. On the other hand it is pointed

out that occasionally one does puncture the cecum especially when the puncture is made in the right flank. In this case, however, it is better to give rectal injections of chloral hydrate and subcutaneous injections of morphine.

—

LABARRAQUE'S SOLUTION: Its value as an antiseptic for the intestine and in surgery. A. Zuerruan (Recueil. de Med. Vet. d' Alfort. 1912, Vol. LXXXIX, No. 9, pp. 291–296).—A 1.2 percent solution of Chorinated soda (Labarraque's sol.) was used for washing out the rectum of horses affected with inflammation of the small and large intestines, as a result of overfeeding. It was also employed the same way in infectious pneumonia. The solution should be prepared fresh each time. Its use in other conditions, such as synovitis, arthritis, colic, etc., is also discussed favorably.

—

ELYTROSAN, a vaccine against contagious vaginal catarrh in bovines. Dr. Silbersiepe (Berl. Tierärztl. Wochenschr., 1912, Vol. 28, No. 46, pp. 849–852).—None of the animals, twenty-seven in all, which were strongly affected with the disease responded to treatment. This vaccine is prepared from the organisms which regularly are present in the enlarged lymph follicles.

—

THE formation of prussic acid from linseed cake and other feeding stuffs. S. J. M. Auld (Jour. Southeast. Agr. Col., Wye, 1911, No. 20, pp. 289–325).—The majority of linseed cakes examined produced prussic acid (HCN) on maceration with water, the amount varying from 0.001 of one percent to 0.052 of one percent. In only a few cases was no HCN formed, owing to the enzyme having been destroyed. The "total" prussic acid content of the cakes examined varied from 0.203 to 0.056 of one percent; average 0.036 of one percent.

The rate of generation of hydrocyanic acid varies with different cakes, and is largely dependent on the temperature of incubation. The formation at blood-heat is extremely rapid, half of the available prussic acid being sometimes produced in fifteen minutes, and the maximum practically attained within six hours.

The enzyme is easily destroyed by mixing the ground cake with boiling water, and a linseed cake gruel properly prepared with boiling water develops practically no prussic acid, even after six hours.

Yeast and yeast-containing feeds decompose the linseed glucoside and hasten the generation of prussic acid.

All the green fodders examined, when in a finely divided condition, strongly inhibit the formation of prussic acid even when they contain glucosidoclastic enzymes. The action is chiefly due to their crude fiber or cellulose.

Cellulose also inhibits the hydrolysis of amygdalin and salicin by emulsion. The action is caused by the formation of an absorption compound between the two colloids, enzyme and cellulose.

Salt, glucose and molasses strongly inhibit the generation of prussic acid. Cane sugar is practically without effect.

Of the conditions prevailing in the digestive tract, acidity and alkalinity both have inhibiting influence. The digestive enzymes also slightly retard the action by attacking the feeding stuff enzyme.

The cyanogenetic glucoside phaseolunatin and amygdalin are nontoxic and are not hydrolyzed with the formation of prussic acid in the animal body.

No fatal poisoning was observed by feeding sheep with linseed cake containing 0.052 of one percent of free prussic acid. When well soaked the material is refused by sheep even when hungry, and the moderate quantities taken after keeping the animals without food induce slight poisoning.

Death was induced in two sheep weighing fifty pounds and eighty pounds by 7.8 and 3.9 grains of HCN respectively. These quantities are equivalent in the former case to two pounds and in the latter to one pound of the linseed cakes (0.052 percent HCN).

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THE treatment of catarrhal mastitis with formaldehyde. J. Pöschig (Berlin. Tierärztl. Wochenschr., 1912, Vol. 28, No. 45, p. 825–827).—The quarter is milked by Hegulund's method and then two to three hundred Cc. of an aqueous solution of formaldehyde (Schering's formalin) containing five to six drops to 100 Cc. of water is injected into the affected quarter. After

withdrawing the catheter from the canal the mammary gland is massaged to distribute the formaldehyde solution throughout the various larger galactoferous ducts. The solution after remaining about ten to fifteen minutes is withdrawn (milked out). In severe cases the above treatment is repeated.

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CLINICAL investigations in regard to the normal pulse rate of our domesticated animals. A. REICHERT (Inaugural-Dissertation, Giessen 1909).—The results obtained by the author with horses, bovines, sheep, goats, dogs, cats, rabbits and chickens may be summarized as follows:

1. The pulse rate of domesticated animals under normal conditions is subject to certain variations.

2. The frequency of the pulse is influenced by the food given, breed, sex, and the time of day.

3. Males have a lower pulse rate than females.

4. Large animals show a lower pulse frequency than small animals.

5. Pure breeds have a lower pulse rate than crosses.

6. Withdrawal of feed diminishes the pulse rate, but the amount of reduction differs with each species. The greatest reduction was noted with the ruminants.

7. The pulse rate of carniverous animals is influenced least by starvation.

8. In horses (excluding stallions) the pulse rate fluctuates between 35 and 40.

Female bovine	70–85
Male bovine	52–68
Pig	70–86
Goats	70–90
Large dogs	72–82
Small dogs	105–125
Cats	116–128
Rabbits	120–140
Chickens	180–200

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IN REGARD to the normal pulse rate of bovines and pigs. Knoll (Inaug.-Diss. Zurich 1910, Bericht über die Konigliche Tierärztliche Hochschule zu Dresden für das Jahr. 1911, [Dresden 1912] pp. 46–48).—The pulse rate of bovines increases progressively until the animals are one year old. Young well nourished calves have a lower pulse rate than those undernourished.

Sex at a very young age has no influence upon the pulse frequency. Only at three months is a difference noted.

The pulse rate is lowest at middle age and only is increased slightly at old age (particularly in draft oxen).

Amongst mature animals cows have the highest pulse rate and oxen the lowest. Bulls occupy the intermediate position.

During the process of digestion the number of beats is increased and reaches a maximum point within two hours. The greatest increase is noted with cows. The highest pulse rate is noted in the evening.

Standing animals have a higher pulse rate than those lying down. This also holds true for horses.

Exercise, trotting without a load produces an increase of fifteen beats within five minutes.

An increase in frequency is noted within ten minutes, when an animal draws a load up a steep road.

Warmth, cold and thunderstorms have a marked influence on the pulse rate.

In sheep the pulse rate varies between 58 and 90.

The pulse rate of pigs undergoes a steady decrease from early age (shoats 113.4 beats until ready for slaughter (1 to 1½ years old, 60–90 beats). As in calves the state of nutrition influences the pulse beats. No difference is noted in the rate of male and female shoats. Adult pigs however, show an average rate of 72.9 for boars, 64.7 for castrated pigs, and 85.2 per minute for females.

Cryptorchids which occur frequently amongst pigs, show relatively high pulse rates (78, 82, and 84).

Digestion affects the pulse rate, but no such differences amongst the sexes were noted as with the bovines.

The maximum pulse rate is noted one hour after eating. Starving the animals for thirty to forty hours produces a decrease of 4. 2 to 5. 4 (average)beats per minute. Exercise makes the pulse of females react quicker than males. The pulse rate is also higher in the female, but with heavy hogs this difference is not so apparent.

POINTED OPINIONS ON LIVE TOPICS by Readers of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the thanks of the editor, the approval of the veterinary profession and the lasting gratitude of those who are aided by your suggestions.

New Symptoms of Shipping Disease in Horses and Mules

IT has been my misfortune this year to have in my practice some very new (to me) and distressing symptoms of shipping fever. I am connected with a live stock company, which handles many horses and mules and my practice brings me in contact with many other dealers, hence I have seen many cases this year so far, of what I am going to describe but hope that I shall never see any more of it.

In presenting this question, I am sure much will be left out that should be told, for no matter how bad I make it I will fall far short of impressing its appalling severity upon the reader. Finally I hope some answer will be made to this paper, bringing out some undeveloped side of it.

First: A load of mules may come in looking well, or there may be one or two animals showing trouble at once. The animals that have the disease come chiefly from St. Louis, but I have seen it in mules coming from local points in Kentucky, where the animals were bought from farmers, but not until they had mingled with the St. Louis shipment. Mules from Atlanta have been known to have the trouble. The shipments have come from St. Louis both via Atlanta and Richmond to this point, and other nearby towns.

The trouble has shown itself in many towns near me and the disease has been equally fatal in every town, and under all treatments tried, as I have seen and communicated with other veterinarians, and have had one other very prominent veterinarian with me once to see if he could help me any. I have asked for aid from every source I thought I could get it, but so far have not gained any, neither from other veterinarians nor from books.

The symptoms first appear by an edematous swelling about the throat, accompanied by a slight cough at times, with a diminished appetite, or there may be edema of the lungs with an almost total loss of appetite. The temperature ranges from 102° to 105° F., with a good pulse until near the end. As the swelling about the throat progresses, in most cases there is difficult breathing, so much so that the animal will fall for want of breath, especially if there is much cough. At this stage the trachea tube is put in, and relief comes at once, but soon, usually within twenty-four to thirty-six hours, the tongue begins to protrude from the mouth as is shown in the picture, and there is no more eating or drinking, though the animal tries hard to do both. There is a complete loss of use of the tongue.

It is dangerous to take the tube out to clean it, for breathing continues very difficult without it. The edematous swelling may go down but the tongue never retracts, nor does the use of it return. This condition will hold on for three to five days, during which time gangrene or

necrosis of the lungs takes place, noticeable by the foul breath, so the animal soon dies with this complication of troubles. In some cases there is edema of the lungs without the swelling about the throat, but the breath soon gives off the same odor and the end is the same.

This disease is very distressing and pitiful to see, for the poor suffering animal will always meet you at the door and will follow you at your leaving, looking for help which I have so far been unable to give. Purpura hemorrhagica has been suggested, and it may be, for petechial spots are evident in the mucous membrane of the septum nasi and the edematous swelling would indicate such. There is no pus in the swelling at all, only a straw-colored fluid. I have autopsied a few cases and find no pus in any of the lymph glands. I am not prepared personally to name this disease more definitely than to call it "edema of the throat and lungs."

I sent the head of one horse to the State Agricultural College, which has a good pathologist, but the answer suggested only purpura hemorrhagica. I have written to some of my veterinary friends in the west but they would not stake their reputation on a diagnosis. I wrote to the B. A. I. and received the suggestion was that it might be "forage poisoning," but that is impossible as there are no symptoms of forage poisoning other than the paralysis of the tongue, which I think comes from pressure on the nerves supplying it. There is no resemblance whatever to "forage poisoning," as I know it, and as it is described, for I have seen much "forage poisoning." These distressing symptoms will develop very rapidly, in some cases even over night, the animal seeming to be doing very well the afternoon previous.

Treatment.—I have used everything I could think would be indicated, and anything suggested by a competent man, such as hot-water applications, antiphlogistine poultices, mustard poultices, ice and cold water, blisters, strong and mild liniments, these being my external treatments. Internally and hypodermically, I have used mixed infection, phylacogens bacterins of several kinds, adrenalin chloride, nuclein solution, strychnine, chlorate of potash, tincture of chloride of iron, heart stimulants and some mouth washes. These, however, not all on one case, but different lines of treatments on different cases, to see if I could find some help, but so far I have been unable to gain any results. I thought once adrenalin chloride was going to do the work, but it did not. Every case but one has died, and that case did not have edema of the lungs and the edema of the throat did not affect the tongue nor the breathing, and the swelling went down, not forming any pus, neither was there any signs left about the throat.

I have seen fifteen or twenty cases and have heard from about twenty more, all ending fatally that I have heard from. This condition seems new, and one thing certain, I can find no dealers that have ever seen it, and have seen some of long experience. The buyers from this community say they can find none of it in the west where they buy, nor are the dealers out there able to tell them of having seen any of it.

I hope I am not writing about some old disease that most all my readers will know about and laugh at my ignorance. If I am, I will appreciate a diagnosis, while on the other hand, if it is new, I will more than appreciate some light on the subject.

A picture of a mule with the tube in his neck, taken the day before it died, shows it as strong looking as a well animal, and so they carry themselves until death comes to their relief.

L. J. Herring, D. V. S.
Wilson, N. Carolina.

A VETERINARY HOSPITAL INCREASES PRACTICE

Since I built my new hospital my practice has increased more than I expected it would and I think it is very much better than having an office in a livery barn. In the first place one makes a better impression in a hospital, where he has the adequate facilities with which to practice. In the office of a livery barn one is always associated with horse cuffers, swipes, etc., and this is a detriment to a scientific man, for whenever an operation is to be performed, there is no suitable place nor facilities, and

every cuffer and swipe on the place insists that he knows just how it should be done. Then, too, with an operating table and quarters adapted to surgery, where things can be kept in an aseptic condition, I find that I, for one, get better results, such as healing by first intention on the minor operations and sometimes on the major operations. These advantages your clients will readily observe, and they are willing to pay a little more for the better work.

Another disadvantage of having a livery barn office is that the man in charge often gets careless and never knows where you are when someone calls for you, even though you had just told him where you were going; whether you be out on a call or just outside the door, it matters not to him.

Often the manager of a livery barn will be grouchy because your fee is larger than he receives for his work. All things considered, I think the hospital is by far the better place of the two, and worth a whole lot more than its cost to any veterinarian.

C. R. WALTER.

Tulsa, Okla.

FETAL DYSTOKIA—SCHISTOCORMUS REFLEXUS

A short time ago I was called to see a cow that had been in labor for about forty hours. My patron, a progressive farmer, said it was a peculiar case that he did not understand. On observing the dam I saw a mass protruding from the vulva, which upon examination I found to be the small intestines of the calf. These I removed and proceeded to examine further. I came in contact with a small hard lump suspended by a cord; this I removed. It proved to be a kidney of the fetus (which however was at maturity) and I was puzzled too: I proceeded with my examination however and found a somewhat square mass, void of hair and skin and legs: I could feel the hips (posterior presentation) flank and ribs, but nothing else. With an embryotomy knife I opened the calf's flank and the first thing I came in contact with was the hair, then the tail, next the head and finally the legs, all where the abdominal cavity should have been. I surely wanted that specimen, but my patron wanted the dam worse, so I proceeded to break down the pelvis, pull out the hind legs (or strip them out rather) and remove it in sections.

Has any practitioner ever seen a similar case?

F. M. LONG, D. V. M.

Doland, S. Dak.

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[The condition of the fetus, here described, is known as *schistocormus reflexus* and is not of exceedingly rare occurrence. It is fully described on page 745 of Williams' "Veterinary Obstetrics."

Cases of schistocormus reflexus have been reported in recent veterinary literature by Dr. D. O. Knisely (A. J. V. M., June, 1911) Dr. L. J. Herring (A. J. V. M., August, 1911), Dr. J. B. McNamon (A. J. V. M., June, 1912), William Caudwell, F. R. C. V. S. (*Vet. Rec.*, July 20, 1912), and by Dr. A. T. Cassity (P. D. & Co's. *Vet. Notes*, September, 1912).

The condition is essentially one where the vertebral column is bent backward upon itself to an extent that the skin becomes a pouch with the hair on the inside and all visceral organs on the outside. There is an opening corresponding to the linea alba from which all four feet usually protrude. A very complete description on this condition and its treatment, together with an illustration is given on page 254 of VETERINARY MEDICINE for June, 1912.—ED.]

A TREATMENT FOR LAMINITIS

In my experience laminitis is always preceded by some intestinal disturbance, such as scouring. It is essentially a congestion of the pododerm, which because it is situated between the os pedis on the inside and hoof wall on the outside, that allow no expansion, is very painful, and easily leads to a stopping of the circulation with its attendant ills. In other parts of the body a similar engorgement is not important because the parts can expand and the circulation of blood in the part is not inhibited.

Treatment: Bleed one pint or about that to the hundred pounds of body weight. Put the horse in a tub of warm water, give a

cathartic bolus and also two drams of potassium nitrate and one dram of acetanilid every hour for the first twelve hours, then potassium nitrate two drams every two hours for one week. Put the bran poultices on at night and stand in tub each day, after first day use cold water.

Always shoe with bar shoe and leave a little space at toe, or better, take off the pressure, at toe altogether for two inches with small heel calks. A little blister around the coronet after ten days often helps.

V. R. LIDSTONE.

Honesdale, Pa.

MONTANA TO EXCLUDE THE UNQUALIFIED

I am intensely interested in every number of VETERINARY MEDICINE and would rather lose one of my instruments or a text book than to miss one number of the journal. I was particularly interested in the January issue. Being a graduate of the Melbourne School myself, Doctor Shand's article on "Veterinary Matters in Australia" was read with unusual interest.

We are endeavoring to get a veterinary practice act through the Montana legislature, at the present session. Montana is away behind in veterinary legislation and is overrun with traveling quacks and empirics, driven here by legislation which has excluded them from practice in surrounding states.

ROBERT SCOTT, D. V. S.

Butte, Mont.

A CASE OF CHOKE

On April 11th I was called to a grey gelding, age eleven years, weight 1100 pounds. As usual I inquired about the symptoms and was informed by the owner that he thought the horse had colic.

On my arrival at two o'clock p. m., I found the horse lying down, resting quietly and apparently suffering no pain. A preliminary examination showed a discharge from the nostrils with slightly accelerated breathing. I inquired of the owner if he had drenched through the nostrils, but was told that he had given him no medicine at all.

After making a more thorough examination and finding a normal pulse, temperature and no disturbance in the lungs, I then made an examination of the throat and neck, finally locating a slight edematous swelling, just above the sternum, which led me to suspect choke. I forced the animal to get up on his feet when he immediately began retching, which proved that I had found the seat of the trouble.

I inquired about his food but was informed that he had had nothing but hay (timothy and clover) of good quality and no grain of any kind. This surprised me as I had never heard of a case of choke on good hay. However, I saw that it was necessary for me to relieve him immediately as he had been choked probably fifteen to eighteen hours. I gave him one-half grain of arecoline and with the consent of owner took him to my hospital. I then decided to try the treatment recommended, appearing on page 157 of the April, 1911, number of VETERINARY MEDICINE (had just received and read that number), so I gave him a one-ounce capsule containing two drams of fluid extract of belladonna and six drams of water, also one-half grain of arecoline; ten minutes later I gave a one-ounce capsule of linseed oil.

After waiting two hours with no results I decided to try apomorphine. I gave him three-fourths of a grain, injecting it in the region of the constriction, then followed with another capsule of oil.

This gave no results, so at 8 p. m. I passed the stomach tube, but this was not successful for at 11 p. m. he was still choked.

I then gave him another dose each of belladonna, oil and arecoline and as he was showing considerable distress at this time I decided that I had better leave him alone until morning, hoping that with coming day I would find him either dead or better. In this I was disappointed, for as I walked into his stall at 6 a. m., he pricked up his ears and gave a sort of half whinny, half grunt, which I interpreted to mean, "Good morning, Doc, I am still alive and hope you can relieve me."

"All right, Old Pal," I said "as long as there's wind in your bellows, I will try to put your troubles on the blink."

I gave him one-half grain of apomorphine following this with another capsule of oil and one hour later gave one-half grain of arecoline. I had kept water in front of him continually but he refused to even attempt to drink.

After waiting until noon, with no results, I concluded to abandon that line of treatment as I was satisfied that I would get no results.

My next thought was to operate by passing the stomach tube, cutting through into the esophagus and ligating the esophagus around the tube, attaching a pump and trying to force the obstruction down that way, but when I took his temperature and found it elevated two degrees, then manipulated the gullet in the region of the obstruction and found it very sore, I discarded that plan as I knew that the inflamed esophageal wall would not stand the pressure.

Well, I figured that I had almost the same as a dead horse so thought I would do a little experimenting. I began to look about for some powerful digestive agent, thinking that I might be able to digest this obstruction. I finally decided on papoid and proceeded to give him one dram, dividing it into two one-ounce capsules, filling the capsules with water. I then gave him one-half grain of arecoline to produce deglutition, then took the water away so that in case he did not attempt to drink he would not wash the drug out through his nose. I then left him until 6 p. m., when I again offered him water, at this time he made an attempt to drink, but most of the water came back through his nose. However, he seemed to look brighter and was resting easier, which gave me quite a little encouragement. (This improvement was probably due to the fact that I had given him about a gallon of oatmeal gruel per rectum.)

At 9 p. m. I gave him another half grain of papoid, and instructed the attendant to place a pail of water in his stall three hours later, and went home. You can imagine my surprise, on arrival at the hospital the next morning, to find the pail of water gone and the horse begging for oats. I offered him another pail of water which he drank with some difficulty. At noon I gave him a sloppy bran mash, and kept him on this diet until the following evening, when I offered him a bite of hay, which he ate without any apparent difficulty. I then gave him a small feed of hay and left him for the night.

The next morning, forty-eight hours after being relieved of the choke, he ate a feed of dry oats and was promptly discharged from the hospital.

There are several things in connection with this case which I consider remarkable, and which induced me to report it. First the character of the choke, second, the length of time before relief (forty-eight to fifty-six hours), third, the drug that brought relief, fourth, the short time after being relieved until he was eating solid food.

J. F. SPIKER, M. D. C.

Sheridan, Wyo.

[Most veterinarians will hesitate to credit the "papoid" with any part in this recovery.—ED.]

SEVERE CASE OF MYCOTIC STOMATITIS

On November 20th I was called to see a two-year-old steer and experienced difficulty in making a diagnosis.

HISTORY. The owner has had the animal for one year. It has been running on pasture. It has shown the following symptoms since November 7th, no other animal in the herd being affected.

SYMPTOMS. Emaciation, dull and lame. Temperature 106° F. (an ulcer on the anus may have affected the temperature somewhat); pulse fifty-five; respiration fifteen; appetite impaired; fetid breath; mucous membranes of mouth hot, red and painful. There are several eroded ulcers on gums one-eighth to one-half inch in diameter. Three of the feet show erosions around coronet and between the claws. All four feet are swollen below fetlock. There is large eroded ulcer on left side of anus and a large amount of proud flesh around it. The penis seems affected and dribbles a thin watery pus; feces thin, dark and fetid.

I suspected ergotism, or poisoning by bichloride of mercury, but thought of

mycotic stomatitis when I saw the animal shake his feet as if to dislodge some dirt from between the claws.

I am treating the case as follows: two teaspoonfuls of carbolic acid on a quart of bran mash daily and a two-percent solution of same to the ulcers. For the mouth I am using a five-percent solution of potassium permanganate.

My prognosis is unfavorable and there is no improvement.

Has any one any better treatment?

E. H. JEWETT, D. V. M.

Perrysville, O.

JUSTICE MORGAN

The president of the Morgan Horse Club has appointed a committee to consider the subject of erecting a monument to the memory of Justice Morgan, who brought the original Morgan horse to Vermont.

The members of the committee are E. A. Darling of East Burk, Governor Fletcher of Cavendish, Hon. Samuel E. Pingree of Hartford, Hon. J. G. McCullough of North Burmington, Hon. E. C. Smith, of St. Albans, Dr. C. A. Gale of Rutland, Hon. E. C. Orvis of Manchester, A. M. Goodrich of Chelsea, and John H. DuBois of Randolph, Vt.

The original Morgan, called "Figure" before he took the name of his master, was brought to the village of Randolph, Vermont, from Springfield, Massachusetts in in the year of 1788 by Justice Morgan, who was clerk of the town of Randolph, Vermont from 1790 to 1793. Justice Morgan died in 1798.

Many years before his death, Mr. Morgan sold his noted horse and this prince of steeds, that lived to be 32 years old, was owned last by Levi Been of Chelsea, Vermont, in which town the horse died in 1821. Not from old age but from a wound in the flank, made by a kick of a horse.

Dr. E. H. Stearns a veterinarian and an active admirer of this Morgan horse, has done considerable through the New England states to perpetuate the valuable family of Morgan horses; he has recently bought the Clover Dale Stock Farm and will use it exclusively for breeding Morgan horses. Doctor Stearns owns some valuable stallions and brood mares possessing Morgan blood and showing the characteristics of that famous family.

F. L. CHATFIELD, D. V. M.

AN UNEXPLAINED DEATH

On November 20th I was called to see a large sorrel gelding with a fistula of the withers of about four to six weeks' standing. The horse had scars on both sides from fistulas six or seven years before. The owner said that the old ones were a long while in healing.

The fistula this time was only on the left side. The horse was stiff and grunted when turned. I told the owner that it probably meant another long siege and I would undertake a cure if he so desired, with the understanding that if after a reasonable length of time his animal showed no improvement that I would not continue, as he did not want a useless expense on the animal.

I at once started with Poly-Bacterins (Abbott) two ampules first injection, and packed the opening with an irritant as I was sure there was a deeper pocket than was showing, which caused the animal pain. I injected two ampules of Poly-Bacterins every three or four days for two weeks, at end of first week the deep cavity opened almost exposing a spine of the vertebra. At the end of the second week the horse did not grunt on being turned and the tract looked healthy and seemed to be healing. After the second week I injected Poly-Bacterins two ampules only once a week.

On December 19th the tract seemed to be improving very slowly and I injected one and a half tablets of Nuclein (Parke, Davis & Co.) subcutaneously, having given Poly-Bacterins on the 15th. On the 20th I got a call to come immediately as horse was down and unable to get up. He had eaten his supper all right the night before and had eaten an ear of corn before I arrived. His temperature was subnormal, only ninety-six and he was helpless and fifteen minutes after I arrived he died. Now what killed the horse?

On postmortem all organs seemed normal, no enteritis; except on cutting through kidneys an oozing of pus-like fluid showed

itself. It appeared as if there were small or minute abscesses or as if it came from the tubules. The kidneys were not congested. But those findings don't seem to me enough to have killed that horse so quickly. The horse did not perspire any before he died. He acted similar to a horse dying of an internal hemorrhage, but there was no sign of this on autopsy. Did the nuclein have anything to do with it? I dissolved the tablets in cold water it being very inconvenient to get hot water, but I injected subcutaneously, so as not to cause shock. He died about twenty-four hours from time of injection. Would certainly like to get some light on the matter if possible.

Philadelphia. W. M.

[It may be said with certainty that the medication in this case did *not* kill the animal.—ED.]

ONE TWIN ALIVE; THE OTHER DECOMPOSED

I want to describe a case to you and ask you a few questions.

December 19th I was called to see a big percheron mare that the owner thought was going to abort. When I arrived I found she had been passing a small amount of pus from the vagina. I told the owner that I thought the condition was local and that I would not insert my arm lest I might produce abortion and we would treat the condition as vaginitis. December 23rd I was called again and found the mare passing a large amount of a thin bloody pus. This time I made a thorough examination. I found the vagina full of pus and the os uteri open. I told the owner the colt was dead and would have to be removed and proceeded to remove it. The colt was between seven and eight months in utero, and was delivered with but little difficulty and to my utter astonishment it proved to be alive. The mare had passed large quantities of thin bloody pus while I was making the delivery. Of course I did some rapid thinking but this was relieved shortly when I had removed the afterbirth and found what appeared to be an abscess on the placenta. The area was about six inches in diameter and possibly one and a half to two inches thick and of a peculiar character. It seemed segmented and would break in pieces like an orange would break, but the surface next the uterus showed all the signs of the inside of an abscess and possibly one-fourth of the placenta was separated from the uterus and the remainder was healthy. The separated part was suppurating.

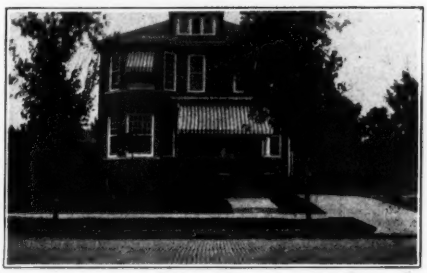
What did I have? Can you give a plausible explanation? [See heading.—ED.]

CHAUNCEY E. COOK, D. V. M.

Ada, Ohio.

CITRIC ACID AND ESERINE IN AZOTURIA

Along in October, 1911, I began experimenting with different drugs in the hope of finding a specific remedy for azoturia and



Home of Dr. E. E. Patterson, Detroit, Michigan

up to October 12, 1912, I felt confident I had found a specific and was highly elated over my success. I had great hopes of bringing out something new and giving it to the veterinary profession, but on that day my hopes went glimmering, as my patient, a big, fine bay gelding, died. Nevertheless I kept on experimenting on such cases, as were permissible, only again to have the underpinning taken away for the second time. I shall continue along the same lines and who ever has the good fortune, or misfortune, to read this article and who will try my treatment, and report through this journal, will be of great service to myself and possibly other practitioners.

I will not try to advance any theory along these lines, other than to say that it is a blood disease. What chemical changes take place and I think it is a chemical

change, I am not at this writing willing to state.

The question has often been asked, do mares in foal have azoturia? Yes. Of the many cases which I have had, two were mares in foal and both recovered and delivered healthy, strong colts.

There are many cases of azoturia which recover with very little treatment, and no doubt would recover, without any treatment, and many cases that die after being treated that would have recovered had they been left alone, also there are certain seasons when the disease is more severe and more fatal, at any rate, that has been my experience, and the treatment has been about the same in the successful cases as in the fatal ones.

Residence and Infirmary of Dr. E. E. Patterson, Detroit, Michigan.

My theory as to this line of treatment dates back to three years ago, when a mare belonging to me that was taken with congestion of the lungs and in order to save her life it was necessary to use a certain drug to thin the blood and I decided to use citric acid in half-ounce doses in a pint of water, its effect was magic in itself and then and there I decided to try it in azoturia, as I had formed an opinion that azoturia was caused by an obstruction in the blood supply. Getting back to the main issue, in the fall of 1911 azoturia patients began to arrive, and I decided to do some experimenting. Out of twenty-six azoturia patients we lost three until October 12, 1912, when the next azoturia arrived and died. I will give a summary of the cases treated in 1912.

All the twenty-six patients in 1911 and 1912 up to October 12th, were treated as follows:

Powdered alum, one ounce, citric acid one ounce, aqua eight ounces. One ounce given in one pint of water every two hours, until it is all used up, also one grain of eserine sulphate, every six hours, until a good catharsis is established.

I prefer eserine sulphate to arecoline hydrobromide. We do not draw the urine. I will not say why we use citric acid and alum, nor why we prefer eserine sulphate to arecoline, nor why we do not draw the urine. Here are a few of the cases to date.

October 12th, bay gelding, double azoturia. Treatment, eserine, citric acid and alum, died the next day.

October 24th, brown mare, single azoturia. Treatment, eserine sulphate, citirc acid and alum, well the third day.

October 26th, bay stallion, right hind single. Treatment, eserine sulphate, citric acid, and alum, well the next day.

November 1st, gray gelding, right hind single. Treatment, eserine sulphate, citric acid and alum, aloetic pill, well the second day.

November 1st, bay mare, right hind single. Treatment eserine sulphate, citric acid and alum, severe case, cured the third day.

November 4th, bay mare, double azoturia, down. Treatment, eserine sulphate citric acid and alum, aloetic pill, on her feet the fourth day, cured.

November 5th, gray gelding right hind, single. Treatment, eserine sulphate, aloetic pill, citric acid and alum, was well the next day.

November 5th, bay gelding, right hind,

single. Treatment, aloetic pill, citric acid, and alum. Cured the next day.

More of our cases we find start in the right hind leg, than in the left. On December 16th, we treated a bay mare having double azoturia; were asked to try phylacogen, which we did, also eserine sulphate, with citric acid and alum. Mare died on the third day.

December 18th, gray gelding right hind single. Eserine sulphate, also phylacogen. Well the third day.

January 1st, roan horse, right hind single. Treatment, eserine sulphate, aloetic pill, two doses only of citric acid and alum. Put to work the next day.

January 4, bay mare double. Treatment, aloetic pill, arecoline hydrobromide, abstracted six quarts of blood, two quarts of normal saline solution in jugular vein. Died in four hours.

You will note two cases treated with aloetic pill and mixed infection phylacogen. I was asked to try it and did, but as yet can not say much about its use in azoturia but hope in the near future to give a report of some cases treated with phylacogen.

A postmortem examination was held on the case that died October 13th. The liver and spleen were engorged with blood; the stomach contained about two quarts of fluid; the small intestines were empty, normal in color, muscular coats and connecting peritoneum and areolar tissue showing a puffed up appearance, and containing a sanguineous fluid, as one would expect to find in enteritis. The kidneys were normal. The fluid in the bladder, did not show the high-colored urine so characteristic of azoturia. The case brought in December 16th showed clearly the same lesions on autopsy as the October case.

The bay mare with double azoturia, was brought into the hospital January 4th and was treated by an outside veterinarian. This case was just cited to show the different methods used by different veterinarians.

Another word or two regarding the right and left and double paralysis. It has been my custom to keep track of all my cases and especially the azoturia ones and I note that the right hind single paralysis usually get well, while the left hind single are the cases that usually die. They frequently develop into the double cases.

E. E. PATTERSON.

Detroit, Mich.

THE CESAREAN OPERATION*

After many failures to extract the pigs, and in the majority of cases, where I was called to assist a sow in parturition, I left in disgust, saying the sow would die; or in other cases, having the sow die while working on her; or perhaps pulling the head off a pig and then being unable to remove the remainder, I finally refused to go when called for these cases, and would loan my extractors to the owner of sow, telling him that I would as soon have him kill the sow as to have to pay my services to do the same. I began to see that I was losing a good many trips that would mean, in a season, many dollars. I had tried douching with normal salt solution, also boiled flax with object to bring on labor pains, but with very poor results in small, very fat sows.

This spring and summer, up to this time I have operated upon nine sows, with but one loss, and in this case I had removed two pigs, leaving one remaining in the womb.

I operate in as simple a manner as possible, and one hour completes the operation, including tying and preparing. Two assistants are essential, one to administer the chloroform and one to hold the upper hind leg steady. I tip the sow on her back and hog-tie all four feet, then with a sponge to her nose with a few drops of chloroform at intervals she is soundly sleeping by the time I have clipped the bristles from the flank region. I use a pair of fetlock clippers and brush the parts well to remove all loose bristles. I then rub creolin undiluted over the clipped area without washing with any water, whatever, as I believe too much scurf would be removed by the water and would get into the abdominal cavity. Then, with a large scalpel, I incise the hide for a length of eight inches and with a pair of tumor forceps

*Read at Minnesota State Veterinary Medical Meeting, July 10, 1912.

on each side of incision, I dissect directly down through the side pork and muscles until I encounter the peritoneum, then with a sharp curved bistoury I prick the peritoneum and insert a six-inch grooved director and with curved bistoury incise the peritoneum at one stroke. Owing to the depth of fat in the flank region, the eight-inch hide incision will only allow the hand to pass snugly into the abdominal cavity. I grasp one horn of the womb and gently lift it toward the incision, and incise it just over the pig's nose, removing all pigs and placenta on one side through the same womb incision. I then suture the womb with shoemaker's linen, interrupted sutures and replace the horn and bring up the opposite horn and remove the pigs in same manner. I suture the peritoneum and muscles with large catgut interrupted and use heavy linen fish line to suture the fat and the hide.

While removing the pigs, I place them in a basket lined with sacks or a blanket to keep them warm, but as soon as operation is completed, I place them with sow and she will be up and ready to eat in the morning. In cases where the sow has been in labor long, I often find the bladder badly distended, I then tap the bladder with a long hypodermic needle, having a rubber tube, at least eight inches long, slipped over its shoulder to carry the urine out through abdominal opening.

When called to these cases, I take along with me a large rubber blanket which I spread down in pig-sty to place my knees and instruments upon. I use a warm creolin solution and do not go to the expense of gauze and do not pretend to having anything sterile, but just clean. I call for half a dozen clean flour sacks (such as are used in the kitchen for dish wipers) and these I use from time to time, soaked and wrung out of creolin solution to place over the incision and to take up oozing blood. Should I strike a small vein, I at once place a small pair of artery forceps upon it, rarely I strike a troublesome spurter.

I believe, I am acquiring quite a reputation in this line and I now have quite a drove of hogs growing into money as an advertisement for me and profit for the farmer.

Small pigs at four weeks old sell at $3.00 each, so to remove from one to six pigs by the side route and save the sow should not be beneath our calling. No after care is needed, unless the sow has been lacerated by the use of forceps, then I advise douching with warm permanganate solution three times daily.

I will report a typical case.

I was called three miles west of town at 1:30 a. m. to assist a large Duroc Jersey sow. I found eleven living pigs beside her, she having had nine without assistance. The owner had removed the tenth and eleventh by means of a small wire hook inserted in under jaw. I found sow in very weak condition and no labor pains. I examined her and found no pigs in the passage. I proceeded to operate and removed two living pigs, making thirteen in all and every pig, including the sow, is alive today after about six weeks. The two that the owner hooked in the jaw baring making faces when nursing, never missed a feed. Sow valued at $25.00, thirteen pigs at $3.00, total $74.00. Can you beat it?

C. L. SEGER, M. D. V.
Janesville, Minn.

PERSISTENT ANOREXIA IN A STEER

I was called to see a yearling steer on December 5, 1912, that seemed to be in perfect condition. Pulse strong, temperature one hundred and one, eyes slightly swollen, one horn was freshly knocked off and from it there was profuse hemorrhage.

The owner found this through his fence on the side of the railroad track. The steer would not eat or drink. A purgative, also a tonic were given. I found no bones broken. The steer is alive today (January 3rd) and has not eaten any food whatever. He drinks some milk and has nux vomica, and a few other stimulants with epsom salts twice daily. The steer weighed six hundred and fifty pounds before he got sick or hurt but is very poor now.

I do not know just what ails him. Could he have been struck by the train and hurt about the facial region to keep him from eating, or is it a paralysis of some kind? He can use his jaws all right; will notice and bellow for the other cattle, and

can move around real well, for an animal so emaciated.

Why does the anorexia persist?

Please suggest something to enlighten me on the subject as it is the first case I ever had that the cause was apparently so slight and the symptoms so grave; slow emaciation and continued anorexia. There is no cough. N. E. GUBSER, M. D. C.

Earlham, Ia.

METASTATIC PNEUMONIA FOLLOWING FRACTURE OF THE TIBIA

On December 8th I was called to see a gray mare, aged nine years, weight 1400 pounds. Found that the mare had sustained a kick on the antero-internal face of the right tibia. There was a small puncture wound caused by the calk. Lameness was marked. A diagnosis of an incomplete fracture of the tibia was made. The puncture wound was treated with antiseptics, Poly-Bacterins were given, the animal placed in slings and absolute quiet prescribed.

On December 16th the stable man informed me that the mare had not eaten her feed the evening previous and upon examination I found her with a temperature of 106° F., pulse 60, respiration 30. Dr. W. E. Wight was called in consultation and an extensive examination failed to reveal the cause of the high temperature. The limb was swollen but slightly and she placed her weight freely upon it.

The temperature remained between 104° and 106° F. without other symptoms being apparent until December 21st when a brownish discharge with a fetid odor was noticed coming from each nostril. Auscultation of the lungs revealed nothing. Gangrene of the lungs was at once suspected, but this diagnosis was not confirmed until December 23rd when moist, bubbling rales were heard extending over the lower half of both lungs. As the animal was in great distress she was killed at once.

Post mortem findings: Tibia: There was a fissure of the bone which commenced at the attachment of the internal patellar ligament, and wound obliquely downward and backward around the shaft of the bone to the distal extremity, where it divided the external malleolus from the distal end of the bone for a distance of two inches. This fissure was blackened and showed no signs of reparative processes except at the proximal end where the periosteum was thickened. The tissues along the line of the crack were blackened, but there was no pus present. Upon sectioning the bone, an interesting condition presented itself. The entire marrow cavity was in an advanced state of decomposition. Putrefactive bacteria had gained entrance through the puncture wound, thence through the fissure and set up operations in the bone marrow, involving the whole cavity. The tibio-tarsal articulation was not affected.

Lungs: There were innumerable centers of necrosis varying in size from a pea to a hickory nut or larger. These were most numerous in the lower and outer parts of the lungs, although no part was entirely exempt. On section these centers were found to contain thick pus. There was a bloody exudate in the pleural cavity.

Conclusions: Death was due to gangrenous pneumonia, caused by putrefactive bacteria working their way from the puncture wound through the fissure into the narrow cavity, and there setting up a focus of infection. The broken down bone marrow was then carried by the medullary veins into the general circulation, finding lodgment in the capillaries of the lungs and there setting up local foci of infection.

A. C. WIGHT, D. V. M.

Pittsburg, Pa.

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[During some seasons fatal gangrenous pneumonia, following calk wounds about the coronet, is not rare in this city (Chicago). These cases follow wounds that are infected with the Bacillus necrophorus and the necrotic areas in the lungs are due to the same organisms. It is therefore a metastatic infection of the lungs. It is invariably fatal.—ED.]

COLORADO VETERINARY ASSOCIATION

The meeting was called to order by President Woodliffe in the rooms of the Gentlemen's Riding and Driving Club, Denver, with a representative attendance.

Dr. Dickey, president of the State Examining Board, made a rather extended report of the efforts of that Board to prevent non-licensed men from practicing. The efforts have been uniformly successful without necessity for legal action, except in one or two cases.

The following officers were elected: Dr. A. B. McCapes, president; Dr. R. N. McCarroll, first vice president; Dr. A. G. Fisk, second vice president; Dr. I. E. Newsom, secretary-treasurer.

A very interesting program was rendered, an important part of which was the discussion of the "Kansas Horse Disease" by Dr. H. Busman of the Bureau of Animal Industry, Dr. G. H. Glover of the Colorado Experiment Station and Dr. C. V. Williams, a practitioner at Lamar, Colorado, who had had wide experience in the vaccination of horses at the time of the outbreak in the Arkansas Valley.

All three papers were discussed vigorously. Dr. Busman taking the view of the Bureau, that all evidence pointed to the cause of the disease as being forage poisoning, whereas Doctor Glover and Doctor Williams were inclined to the belief that forage poisoning did not explain all the phenomena, but that the disease was probably infectious.

"The Use of Serum in Hog Cholera" was presented by Dr. J. F. Meinzer who had vaccinated something over 1200 head by the serum-only method, with about seventy percent of recoveries. He took particular pains to keep the sick hogs with the well ones for at least ten days following the injection of the serum.

The following resolutions of general interest to the profession were passed:

1. RESOLVED, that the Colorado Veterinary Medical Association is in favor of a change in the constitution of the A. V. M. A. to permit state associations voting representation therein and recommends the appointment of a committee to gather information thereon.

3. RESOLVED, that none but graduate veterinarians licensed to practice in the state of Colorado be allowed to conduct tuberculin and mallein tests.

4. WHEREAS: Only men who are graduates of recognized veterinary colleges are legally entilted to the title of "veterinary surgeon," and,

WHEREAS: There are various positions in the state in which the law specifically provides for the appointment of a veterinary surgeon, and,

WHEREAS: Under the civil service law now in force in this state, the Civil Service Commission will in all probability hold examinations for such positions, therefore, be it,

RESOLVED: That the State Civil Service Commission be, and is hereby requested to rule, that in all examinations held by them in which the law provides for a position to be filled by a veterinary surgeon, only graduates of recognized veterinary colleges shall be eligible to take such examinations.

The next meeting will be held at Fort Collins during the latter part of May or the first of June.

I. E. NEWSOM,
Secretary-Treasurer.

Ft. Collins, Colo.

ACTUAL CAUTERY FOR COLD ABSCESSES

In VETERINARY MEDICINE for December (page 555) Dr. F. A. Zucker gives us the benefit of his method of treating fibromas or "cold abscesses" and it is exactly the method I have used for many years. I, however, run a lance straight into the fibroma at the point I wish to insert the hot iron and generally let out some pus and then with the point of the iron slightly curved I burn out the cavity. Cutting into it first makes it easier to insert the iron. Since one of them healed leaving a little pus imprisoned I have always made the opening large enough to allow the insertion of my index finger smeared with carbolized vaseline and I always instruct the owner to do this daily so long as the opening is large enough to permit of it. Before doing this though, I rinse it out once thoroughly with a hot antiseptic to wash out particles left by the cauterization. Every case has healed quickly and well.

I am glad to renew my subscription to the journal. Often some little article alone

is worth the price of a whole year's subscription and I'd feel lost without it.

J. S. LAMKIN.

Ashby, Mass.

A MOVE TO DETECT UNRELIABLE INSPECTION

RESOLVED THAT: It is the sense of this Association that the authorities charged with the control of live stock sanitary matters in each state do everything in their power to encourage the owners of tuberculosis-free herds, as determined by official tests. To this end the names and addresses of the owners of such tuberculosis-free herds should be supplied to the agricultural press for publication and time limits on tuberculin test certificates accompanying interstate shipments of cattle from such herds be extended as may seem wise.

It is further the sense of this Association that the names and addresses of the owners of notoriously tuberculous herds and those of unscrupulous dealers shall be furnished to the authorities charged with the control of contagious and infectious diseases in the several states.

It is further the sense of this association that any member having knowledge of fraudulent tuberculin testing or other inspection being done by any veterinarian for interstate shipment shall notify all other members of such facts for their guidance.

S. SHELDON,
Secretary.

American Association of State and Provincial Veterinarians.

OHIO VALLEY VETERINARIANS HOLD A RECORD BREAKING MEETING

The ninth annual meeting of the Ohio Valley Veterinary Medical Association, which was held at the Terre Haute Veterinary College in Terre Haute, Indiana, February fifth and sixth, was pronounced a grand meeting by all present.

Dr. C. I. Fleming, Terre Haute, Indiana was re-elected president and Dr. C. T. Howard of Sullivan, Indiana, was re-elected secretary.

After the regular business session the following interesting papers were read and discussed.

"Meat and Milk Inspection," by Dr. C. F. Lynch, Terre Haute.

"Necrobacillosis," by Dr. Northop, Indianapolis. Ind.

"Urinary Analysis," by Dr. H. E. Washburn, Clinton, Ind.

"Phylacogens and Vaccines," by Dr. G. W. Mackie.

"Anatomical Structure of the Foot," by Dr. O. C. Newgent, Terre Haute.

At the close of the evening session a "Dutch lunch" was enjoyed.

The clinics which were held Thursday proved very interesting from start to finish. They were conducted by Doctors Fleming, Newgent and Barnes.

1. The removal of a second superior molar, which had been in a diseased condition for some time. Simple trephining did not suffice for its removal and the plate operation was necessary.

2. Median neurectomy which was very satisfactorily performed by Doctors Wesner and Dreppard.

3. Dr. C. I. Fleming fired a horse for a flat splint under the suspensory ligament. This operation proved very interesting.

4. Doctors Luther of Boonville, Ind., and Fauss of Selvin, Ind., performed cunean tenotomy, and elicited much favorable comment by the neatness with which it was done.

5. Dr. Swain of Decatur, Ill., and Dr. S. V. Ramsey, Sr., of Terre Haute, Ind., performed a very interesting operation—the removal of a supernumerary tooth from the side of the temporal bone in front of the conchal cartilage to which it was very firmly attached.

6. Ovariotomy in a heifer, by Doctors Newgent and Snyder.

7. Ovariotomy in a heifer, by Dr. Carmack, of Dana, Ind.

8. Thyroidectomy in a dog, which was placed under a general anesthetic. The technic was splendid, the operation resulting in but very little hemorrhage. Doctors Jett and Lynch of Terre Haute performed the operation.

9 and 10. Ovariectomy on two bitches, performed by Dr. S. V. Ramsey, Jr., required but eight minutes.

11. Doctors Newgent and Snyder followed Merrilat's technic in amputation of the penis. The operation was very interesting.

12. Dr. McClain of Neoga, Ill. and Dr. Bancleve of Chrisman, Ill. performed the Blattenburg operation for roaring on a mule, time required seven minutes.

13. Dr. S. V. Ramsey, Jr., performed an intestinal anastomosis. A section of the illeum being removed and the ends united by lateral anastomosis.

14. Doctors Fleming and Northop operated on a mule for contracted tendon. The tendons were severed and re-united by ligature. The leg was then placed in a plaster of paris cast to hold in position.

15. Doctors Coover and Scott performed cunean tenotomy upon a mare with a very large spavin, the operation gave instant relief to the animal.

16. Doctors Fleming, Ward and Snyder operated on a horse for quittor. It was a very difficult operation.

17. Doctors Vancleve, Davis and Hanna performed the Williams operation for roaring.

18. Dr. Newgent performed arytenectomy, Blattenburg operation.

19. Last but not least of the operations performed at the great meeting of the O. V. V. M. A. was the removal of a three-year-old heifer from Dr. S. V. Ramsey's private office. After being turned out of the operating room she proceeded to wander about taking in the sights until she came to the office, and it looked so inviting that she walked in and made herself at home.

The summer meeting of the O. V. V. M. A. will be held at New Harmony, Ind., in July.

C. T. HOWARD,
Secretary.

Sullivan, Ind.

Dr. J. C. Bowman of Tecumseh and Dr. Wilber Divelbiss of Elk Creek have formed a partnership for the practice of veterinary medicine at Syracuse, Nebraska, to succeed Dr. J. T. Buchtel, who will locate elsewhere. Dr. Bowman was recently elected president of the Nebraska Veterinary Medical Association.

SESSION OF THE PERMANENT COMMISSION OF THE INTERNATIONAL CONGRESS OF VETERINARY MEDICINE

(Abstract.)

The Commission assembled at nine a. m., October 25th in the Library Hall of the National Veterinary School at Lyon. Mr. Faure, the director, received and welcomed the president and members in Convocation Hall.

The president thanked the commission very cordially for the splendid photograph of its members which had been presented to the school and was exhibited on a table in the hall, at the same time delivering an official letter expressing the thanks of the teaching corps of the school for this high token of regard. In conclusion Mr. Faure the commission the use of a hall more quiet and appropriate for its work in the library invited the members to a breakfast offered by himself and the professors of the school.

The president expressed to Mr. Faure the sincere thanks of the commission for his hospitality and his good care of them after which the commission began its labors.

Those present were: Mr. Lydtin (Germany) *President*, Mr. Hutyra (Hungary) and Mr. Degive (Belgium *Vice Presidents*, Mr. de Ratz (Hungary) *Adjunct Secretary*, Mr. Happich (Russia), Mr. Hangka (Austria), Mr. Hess (Switzerland), Mr. Theiler (South Africa), Mr. Piot (Egypt), Mr. Perroncito (Italy), Mr. McFadyean (England), Mr. Stockman (England), Mr. Schimmel (Netherlands), Mr. Locusteanu (Roumania), Mr. Barrier (France), Mr. Kjerrulf (Sweden), Mr. Malm (Norway), Mr. Bang (Denmark), and Mr. de Jong (Netherlands) *Secretary*.

Order of Business

1. Report of the secretary on the activity of the commission since the meeting at Baden Baden in June, 1911.

2. Resolution on the installation of the permanent secretaryship at the Hague (thirteen countries represented in the commission have approved: eight countries have not yet responded).

3. Resolution on the proposals of the English executive committee.

a) On the date of the London Congress.

b) On the questions to be treated at the London Congress.

c) On the organization of this Congress.

4. Measures to be taken to obtain the participation of veterinarians, physicians, and agronomists of all countries in the London Congress and to secure the aid of the press.

5. Wishes and proposals of the members of the commission.

The secretary read a report of the labors of the commission since the session at Baden Baden in June, 1911. The report was approved and accepted.

Mr. de Jong took the floor and read a communication from the Minister of Agriculture of the Netherlands inviting the Congress to install the permanent secretary's office at the Hague. Then the proposal to establish the office permanently at the Hague under the conditions established at Baden Baden was unanimously accepted.

The president expressed his thanks to the Dutch Minister of Agriculture. The commission sent a message to His Excellency, communicating to him the resolution and expressing to him its gratitude; in the course of the meeting an amiable answer from His Excellency was received.

On the proposal of the English members, and after some discussion, the date of the next Congress at London is fixed for the first week in August, 1914 (six days).

As to the organization, Mr. McFadyean, who, with Mr. Stockman, had presented a provisional program, said that he borrowed it from the Congress at the Hague, but that he has proposed less general sessions. Many members, among others Messrs. Degive and Barrier, on the contrary desired more general sessions. After some discussion on the subjects to be treated and on the sections, the organization of the Congress was entrusted to the English executive committee, which will reckon with the desires of the permanent commission, which recommends above all to avoid conflicts between the general sessions and those of the sections. Among the questions which should be treated by the general sessions were named: tuberculosis, foot-and-mouth disease, intoxication by animal-foodstuffs, sanitary milk control, the causes of abortion, veterinary education, and others. As subjects for the sections were recommended questions of pathology and bacteriology, enzootics, medicine and surgery and the tropical diseases.

Mr. de Jong mentioned also questions to be treated remaining over from the Congress of the Hague and stated that Messrs. Van Es (United States), Lignières (Argenitine) and de Blieck (Buitenzorg, Java) had expressed special wishes concerning the Congress. This was referred to the English executive committee.

To a question of Mr. Barrier, as to the budget of the future Congress, Mr. McFadyean gave a very reassuring answer. From $15,000 to $20,000 is already available and a still more considerable sum is expected. The Congress receives a good deal of support and appreciation in England. The official invitations will be made by the Minister of the Exterior of Great Britain. Mr. Barrier recommends sending the invitations early.

The president thanked Messrs. McFadyean and Stockman for their reports concerning the London Congress and recommended the formation of national committees in all countries.

Mr. McFadyean wished that the members of the commission would each kindly encourage the attendance from his country to the Congress of London which will celebrate the semicentennial of International Congresses.

NEWSPAPER COMMENT

Dr. J. H. Ferster of New York is securing much publicity in New York papers through his advocation of a serum prepared by the Board of Health for the cure of glanders in horses.

More than twelve hundred horses, valued at $400,000 were destroyed in New York City last year because of glanders, which is a problem of great importance to horse owners in that city.

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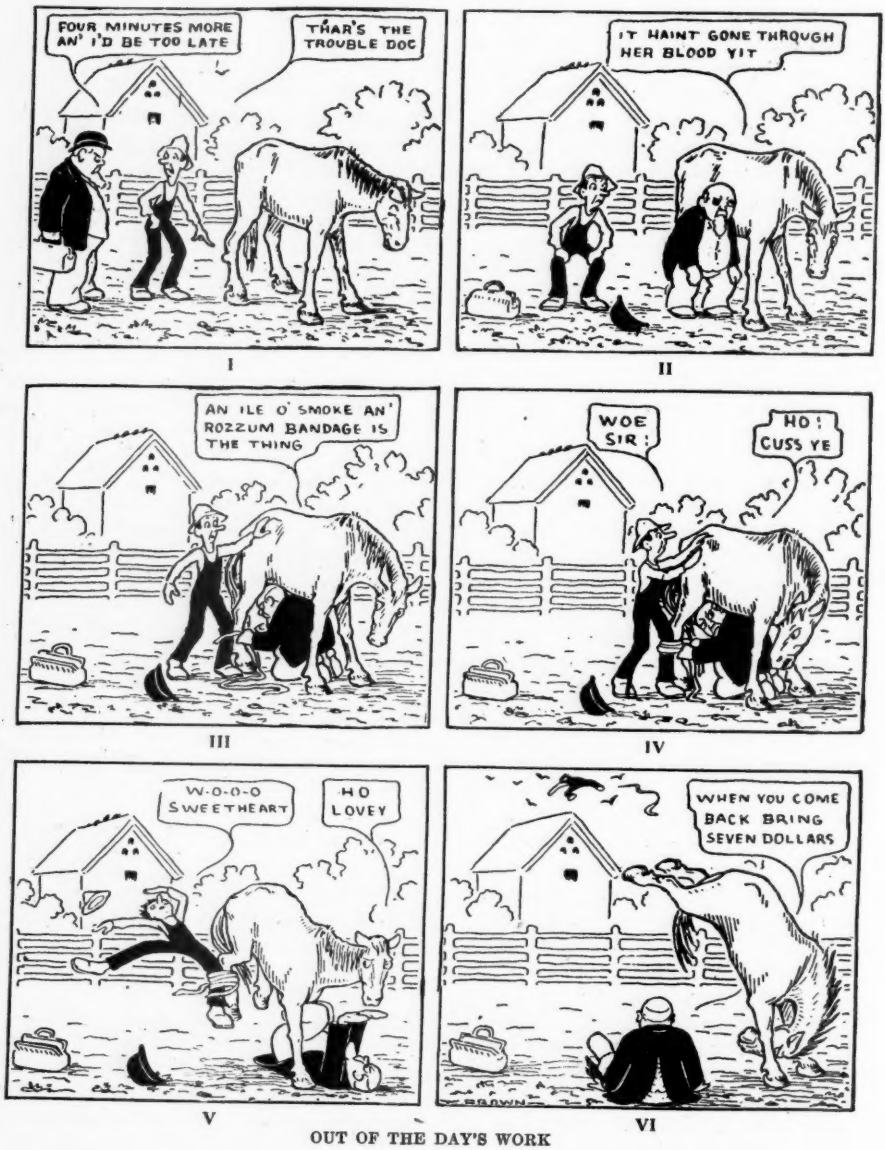
Mendota, Illinois, has a new veterinarian. Dr. D. R. Taylor may be found at Richert's livery.



OUT OF THE DAY'S WORK

The above sketches, from *The Country Gentleman*, contain some genuine humor, which everyone who remembers the old time "horse doctor" of two decades ago and longer, will appreciate.

The Country Gentleman is the oldest, yet the newest and best, of farm papers. It is published weekly by the Curtis Publishing Company of Philadelphia; if you are not already on its subscription list send for a sample copy. There is no issue but that contains much of interest to veterinarians. It is a farm paper of a class to be expected only from the publishers of the ***Saturday Evening Post*** and ***The Ladies Home Journal***, better known only because they have been published by the Curtis Company for a longer time.

Deputy State Veterinarian J. R. Ward of Missoula, Montana was quoted in local papers as saying that more than 1000 horses died of pernicious anemia in Montana last year. Among other results from this publicity was a telegram from State Veterinarian M. E. Knowles, requesting Dr. Ward's immediate resignation, and a denial of the statement that swamp fever is prevalent to any considerable extent in Montana.

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Dr. C. D. Tuttle of Canton, South Dakota, recently had an index finger severely lacerated while operating on a horse.

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The farmers of Madison County, Indiana have petitioned the legislature for an increase in the appropriation for making hog-cholera serum at Purdue University.

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Mississippi has joined Tennessee and Louisiana in a campaign against turkey buzzards, which are looked upon as important spreaders of disease among animals.

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Dr. A. Knight, Dominion veterinary inspector, of British Columbia, attended the Missouri Valley Veterinary Association in Kansas City in January, and subsequently visited the State Veterinary Department of Missouri in pursuance of a study he is making of the intradermal tuberculin test.

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Dr. Samuel Sheldon, state veterinarian of Missouri, has presented a bill to the State Legislature which, if passed, he believes will prevent the importation of Texas fever, hog cholera, tuberculosis, and glanders into Missouri.

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Dr. J. K. Callicote, state veterinarian of Oklahoma ,has tendered his resignation to the Board of Agriculture to take effect July 1st. Dr. Ben Dobbins of Vinita, president of the Oklahoma Veterinary Medical Association, has been selected to fill the vacancy when it occurs.

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A bill has been introduced in the Nevada legislature raising the pay of the state veterinarian from $1800 to $2500 per year.

Dr. W. J. Williams, Plymouth, Illinois, is taking the Pasteur treatment in Chicago, because of a possible infection due to his attempting to medicate a calf, that later died of rabies.

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Farmers in various sections of that state have petitioned the Iowa legislature for $50,000 for the manufacture of antihog-cholera serum. There is much opposition to this bill in the legislature, mainly the result of a contest between the State College at Ames and Des Moines for the location of the serum laboratory.

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Dr. John Montgomery, a recent graduate of the Chicago Veterinary College, has located for practice in Anamosa, Iowa.

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The next meeting of the Texas Veterinary Medical Association will be held in Fort Worth, during the Fat Stock Show in March. In cooperation with the local Bureau of Animal Industry an educational feature for the stockmen of the state is being planned. Veterinarians from every part of the country have been invited to this meeting which occurs March 11th, and 12th. Drs. A. D. Melvin, Washington, A. T. Kinsley, Missouri, J. W. Klotz, Indiana, and D. M. Campbell, Illinois, among other visitors, will read papers at this meeting.

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Jacob J. Lammie has been arrested at Leola, South Dakota, for practicing, as a veterinarian, without a license. Mr. Lammie's offense consisted in injecting horses with blackleg vaccine, from which seven of them died.

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On January 27th Gov. A. J. Pothier reappointed Dr. John S. Pollard a member of the Board of Registration in Veterinary Medicine for the term ending January 31, 1918, and at a meeting of the Board held February 11, 1913, he was unanimously re-elected secretary. Dr. Pollard is a member of the American Veterinary Medical Association and is resident secretary for Rhode Island. He has been president and secretary of the Rhode Island Veterinary Medical Association and holds the position of State Veterinarian, which he has held continuously since 1899. Dr.

Pollard is a Shriner and a thirty-second degree Mason.

—

An account of how Ohio is dealing with hog cholera occupies the position of leading article in the *Breeders Gazette* for February 13th. It is stated that Ohio's daily loss due to hog cholera is from $25,000 to $40,000 during the fall months. Ohio has a new $125,000 serum institute ready for dedication. The receipts from the sale of serum in 1912 amounted to $50,000, and 100,000 animals were treated with it. The animal-disease-prevention-work is in charge of Dr. Paul Fischer, state veterinarian.

—

I would like to know if any one else has had good results from the internal use of potassium iodide in the treatment of periodic ophthalmia, or is there something better? I have had reasonably favorable results from this treatment but am desirous of something better.

G. I. S.

———, Kan.

Nan

By GORDON G. BURDICK, M. D., Chicago, Illinois

One of the most cherished privileges claimed by these people was the right to work for six days in the week and the privilege of getting drunk Saturday night and staying so until Monday morning; as a general rule they were peaceable cattle who stayed among their own kind and did nothing worse than worry their neighbors with their songs and carousing. The police, instigated by some of their sharp countrymen, used to make a clean-up Saturday night with the rest of the underworld and they made rich pickings for these harpies. I grew to know them in the course of my professional relations and used to drop around on Sunday and get them out on bonds and have their cases dismissed on Monday. It was not long before these people began to appreciate my efforts and instead of going to the man who was bleeding them, they depended upon me to get them out of trouble and I had become a very important man in their community. So the Big Boss knew that I could handle them better than any other man in the precinct.

The other party had lined up the sharks and it began to look as if our party would be defeated as these people were so numerous and voted solidly on any question that was put up to them. It seemed that I had tackled a very hard problem as I found that most of the people had been commanded to vote for Judge Barley Corn, and the work had been done well, and I saw plainly that I would have to rustle around among them and find new leaders, as all their old ones were connected to the other fellow, so I sent out invitations to twenty young men who had caught on to the English language and bid fair to become very important members of the community and invited them to meet me at dinner Saturday evening, and I had seen to it that there was plenty of refreshments dear to the foreign tongue and while I was a teetotaler myself I had provided liquid refreshments in plenty for the inner man.

The "blow-out" as it was known, was held in the back room of one of their prominent saloons and excited considerable curiosity as to what the Doctor was driving at. It might be said in passing that the saloons were the social gathering places of these people. Usually a high platform was built back of the bar, which was separated from the main room by a short curtain, and different cliques met on Saturday night to drink and dance until Monday morning. At this time nothing was thought of it from a moral stand point and the best of their people were in attendance.

THE MEETING

I was on hand early with my young foreign supporters who were expected to do two things, pass the beer, and so forth, and hurrah for Judge Winesoke and they were supposed to pledge as many men as possible on an individual pledge. It was evident by seven o'clock that the meeting would be a success as my foreign friends began to arrive from the different communities and I soon saw that I was to be swamped by the number that were coming, and after conferring with several of my young men I had two other meeting places opened in the neighborhood and well stocked with good things to eat and drink. This later proved a good move as my entertainment was well appreciated and drew the foreign population in great numbers.

I was kept busy shaking hands with the people who knew me and left it to my young men to see that they were gotten into the proper frame of mind to listen to my speech of the evening and the fun was fast and furious until it was up to me to dance with some of the popular young ladies in order to show them that they had my sympathy in their amusements. I soon learned, however, that my scheme might fail as my young men told me that all the people were connected to the other side. It seems the great G. T. & Company had their agents among the people telling them that they would close their factory if this Judge Winesoke was elected and this was a serious handicap owing to the fact that nearly all of these people worked for this corporation and it always has been hard at any time since the history of mankind has been written to argue with a man whose food supply is in danger. They will vote blindly for their dinner in the face of arguments to the contrary, and in a few minutes it seemed to me that it was hopeless trying to change their view of the matter; the matter was so urgent,

however, that I concluded to run the risk of inflaming their minds by showing them that their national customs were in danger and as I well knew every man in the crowd would die for his so-called customs rights. This matter ran through my mind rapidly as I rose to make my speech and as I surveyed the throng of people I realized that I must change my ideas if I expected to win in order to make facts fit conditions.

THE SPEECH

I was received by shouts, applause and by some foreign lingo that meant "he's all right" so familiar to college boys, and when the hubbub subsided I commenced:

"Friends, you do not know me as a politician or a speech maker, and it may surprise you to know that besides my ordinary accomplishments of playing the stork, vaccinating the kids and getting their daddies out of jail for drunkenness, that I make an attempt to do some work in the political line. Now, friends, I know that the great G. T. & Company have promised to shut down their plant if Judge Winesoke is elected and that some of you are afraid you are going to lose your dinner in consequence of it, now, friends, let me tell you something —this great company is fooling you, they do not intend shutting down their factory. They want Judge Barley Corn elected because he is such a good man that he does not believe in a poor man getting drunk on Saturday nights and he has promised the company if elected, to send all you fellows to jail who are found drunk Sunday. Now our man, Judge Winesoke, gets drunk himself on Saturday night and thinks it all right for any poor man to do the same. Now you fellows can do as you think best but you need not come to me in your trouble if you put this fellow in office."

My speech was received with such universal approbation and nods of approval that I was surprised, and I gave room for another speaker, and while standing back a young girl plucked my sleeve and when I bent down she whispered, "Mr. Doctor, please be so kind as to pardon me, but your man Jake lied to the people when he told them your speech, and he changed the name to the other man."

I glared at the measly specimen of a Roumanian Jew who had played this trick on me for an instant, and then started for him.

THE SCRAP

When I realized the treacherous trick that my interpreter had played upon me I lost my temper, as I realized that he had made my work so much harder and I resented it strongly as the traitor was under many obligations to me, both he and his family. It was through my own energy that a collection was taken up, to pay his house rent and keep the landlord from throwing him and his family out of doors in midwinter when he was suffering from inflammatory rheumatism, and I traveled through some of the bitterest winter weather to take care of him while he was helpless, so it was hard to realize that he had played a trick of this kind upon me. That he was guilty I had no doubt as he grimaced something like a cat that has been caught in a cream pitcher, as he retreated behind a gigantic man who had quietly arisen from his chair and was regarding me with loutish amusement. This made me hesitate before going after the interpreter and a quick look around the room showed me four other pace makers present from the great G. & T. Company, and I began to get a faint idea as to whom I was fighting in the campaign. Then I realized that I was confronted by these brutes who had their being, setting a pace for their weaker brothers to follow. Many times in the past I had gritted my teeth and wished for an opportunity of meeting these men as I had watched by the bedside of some pitiable specimen of humanity who had dropped by the wayside while trying to keep up his end and feed his hungry family, and here a kind providence had seen fit not only to throw them in my way, but actually as an active antagonist.

While I had not figured on any opposition, still I was too good a politician not to provide for possible emergencies likely to happen at any political gathering, and before mixing in the fight myself, I blew a police whistle loudly, knowing full well that within the sound of my blast were two human fighting machines with real Irish blood in their veins, who stood ready at my command to put anyone in the crowd in the hospital or morgue as might be deemed best. It would not do, however, for me in a community where might made right, to refuse a challenge coming so openly to me

found him flat on his back with my pug walking on his anatomy

before my friends. If I had turned yellow, every man in the crowd would have regarded me as a joke and I never would have heard the last of the matter, so after calling my trained aids I sailed into the biggest of the pacemakers, and my onslaught was so sudden and unexpected that I knocked him down. He scrambled to his feet and began a series of bull rushes at me, which I side-stepped carefully, planting a blow here and there as opportunity offered, hoping he would tire himself out in his wild rushes and give me an opportunity to put him down and out. His object was to get his hands upon me, and mine to see that he did not succeed, as I well knew that I was no match for his brute strength. Suddenly as I planted a blow and stepped back, some one gave me a violent push right into his clutches, and now began a life and death struggle, he to get me into his arms to give me the Russian bear hug that would have cracked every rib in my body, and me to get a grip on his windpipe. I worked silently but patiently towards the object in view and while he was raising my up and down trying to throw me off my feet, an opportunity presented itself and I grabbed him by a throat hitch, which he and I knew was the beginning of the end. He threw me around like a whirlwind

trying to shake me off and during one of his violent spasms, I was lifted bodily over his head and slammed violently to the floor, but in vain, and after he had tried this procedure several times I came up to him unexpectedly with both knees in the solar plexus and the festivities were over as far as he was concerned for that evening.

Tremendous applause greeted my victory, and by this time my blood was boiling, and I looked around for the party that pushed me. This one I had no difficulty in finding as he was stretched out flat on the floor, while one of my pugs was tramping back and forth on his anatomy, and as I later found out, he was the employment agent of the great G. & T. Company; satisfying myself that he had all that was coming to him, I turned my attention to the three other pace makers who showed fight in the beginning, and who were now a very meek and crestfallen lot, and walking up to the biggest one I gave him a resounding slap around the jaws, pulled his beard and in other ways tried to arouse his spunk and tried the same method with the rest but they had had all they wanted, and on a sign from me they were seized by my pugs and cast out into the open air greatly to the amusement of the crowd, each one of whom had suffered from their pace making in the factory.

This row being settled to my satisfaction, I looked for my interpreter but failed to find him, until a little girl told me he had gone into the back room and had hidden under the bed. I went after him and getting a good hold on his long hair dragged him out before the people, and having picked up a heavy cane near the bed I began to deliver my speech again, whacking the interpreter over the shins occasionally just to hurry his thinking apparatus and not give him a chance to lie. The crowd went wild with the exhibition and when I left that night I knew that Judge Winesoke's election was sure, as they were with me to a man.

I do not think I ever was so tired before in my life, and as I tumbled into bed, I fell asleep in a very few minutes, only to be aroused in an hour by the violent ringing of the telephone bell. I was almost too tired to care who was there and contempleted over the matter for some time before getting up, hoping they would desist, but evidently the party was one who had plenty of persistence as he kept at it and at last I got up. To my surprise it was the Big Boss and his voice, usually so oily, had a buzz-saw sound to it.

"Say, young man, what did you tell those people out there, tonight?"

"Why?" I asked.

"Well, my reports have it that you told them Judge Barleycorn was a church member and did not drink liquor while our man was a drunken brute. Is that so?"

"Why sure," I said.

"Well, what did you do it for?"

"Say John," I said, "do you think for one minute that these people want a church member and a prohibitionist for a judge? They want someone like themselves, who indulges in liquor and has some sympathy with their ideals. Now go to bed. I have these three precincts in my pocket and Judge Winesoke is elected and don't make any mistake about the matter."

"Well," he said, "I hope you are right, but don't play the traitor with me or it will be the worse for you."

"Now, see here," I said, "you were promised that I would deliver those precincts. If you want to help why not tie a knot in the tail of the great G. & T. Company, as this company is furnishing the money and brains to throw you down."

"Is that so?" said the surprised Boss.

"Sure," said I.

"Well, what would you suggest?" he said, after a pause.

"Well, I believe you would make a ten-strike if you take a gang of men out there tonight and dig up their water supply."

"What do you know about it?" he said with sudden interest.

"Well," I said, "Uncle Jerry, their chief clerk, incidentally told me that their water bill last year was only two hundred dollars and I know they have a twelve thousand horse-power engine going with no condensers, to say nothing about numerous other uses for water in their plant. I can only estimate the amount stolen but I believe their water bills should be about twenty-five hundred dollars a year at a very low estimate and then besides, they have closed two stub ends of streets without permission."

"Are you sure you are right?" said the Big Boss.

"It is a cinch," I said, "those fellows would steal the cents off their dead mother's eyes."

"Well, goodbye, I am in a hurry and will see you tomorrow," said the Boss.

I went back to bed for a well earned sleep and did not awaken until my rest was disturbed by a swarm of newsboys yelling, "Uxtry, all about the water scandal. Millionaire thieves caught stealing the city water. Superintendent Dolan descends upon the great G. & T. Company with a large gang of men in the early morning hours and after tearing up the streets, found several unchartered pipes running into their plant."

After I had called in an urchin and purchased a paper I got the details of a very successful coupe carried out by my friends and I knew that this great G. & T. Company would be too busy for the next week or so to bother about me, a prediction that was carried out as my friends were almost unanimously in favor of Judge Winesoke and he was elected by a close majority.

I was not slow in taking advantage of the campaign ammunition given me by the exposure and got up a torch light procession the night before the election, with banners that covered the ground thoroughly. This pleased my people immensely, to think I had nerve enough to make a direct attack on this great company and the incongruous situation developed that some of my standard bearers were employees of this great company.

THE POPULAR HERO

While I had no clear idea as to why I had mixed in the election fracas, and was heartily ashamed of myself for letting my temper get the best of me, I found that my private opinion was not shared by the community. I had suddenly sprung into the lime light and found everyone talking about my prowess, while my acquaintance was sought by many who up to this time had looked upon me with indifference. I was asked to accompany the Boss to some of his conferences with his lieutenants and heard myself praised in no uncertain terms to his henchmen. I was told extraordinary stories of my bravery and the extent of the fight. I was the center of an admiring throng of young urchins, who watched their opportunity to feel of my biceps and used their arms to convey to others my marvelous development in this detail. I found that I was regarded fondly even by the women who smiled upon me when we met, until I really began to think

that perhaps I had done something wonderful, until my head was getting rather too large for my hat.

The Boss told me that I had earned any reasonable reward that was in his power to give, and asked me what I would like. This surprised me greatly as at this time I had no real conception of the rewards given in political preference, I believing, like most citizens that appointments were made upon their merits and not for work done in the ward, so I thanked him and said I did not want anything.

He looked surprised, and after regarding me as some freak for a minute, he blurted out, "Well, what in h— are you in politics for?"

"Say," I said, candidly, "you can search me, I do not know."

The evident sincerity of the answer nonplused him for a minute, and after turning his cigar around in his mouth a few times, he remarked, "Well, you are green. But you are too good a man to let slip. How would an appointment to the County Hospital staff suit you?"

"What's in it?" I asked.

"Well, you will get plenty of experience."

"Say, John," I asked, "do you honestly think I need any more experience than I am getting? Haven't I a representative from all the nations of the earth with all their peculiar diseases? I am now working twenty hours a day, mostly for experience, do you think I should give the richest country in the world the other four hours?"

"Well, um, if that is the case I would not take it either, but there must be something in it, or so many doctors would not pay so much to get on the staff. What I offered you I can get a thousand for any day."

"All right, " I remarked, "take it. I may ask some favor of you, although I have no idea at present what it might be."

I went home thinking much about the devious ways of opening up opportunity through political pull, but not getting a clear idea in my head about the matter.

I found a message waiting me at home asking me to call up a certain number and when I did so I recognized the familiar voice of Uncle Jerry, the bookkeeper for the great G. & T. Company.

"Say, Doctor, I have been trying to get you all day. Something important has happened. Our Boss learned that you gave the information out about the water steal and he is sore. He called Smith (the employment agent) in and gave him instructions to see that you did not butt into their business again. Smith asked him how far he was willing to go, and he said he would pay one hundred dollars if you were given a good licking, five hundred if you were sent to the hospital, and a thousand if you went to the morgue, and he suggesgted Black Finnegan as the most likely person to do the work with neatness and dispatch. Now, Doctor, look out, as this fellow has done work for us before and it was only too satisfactory."

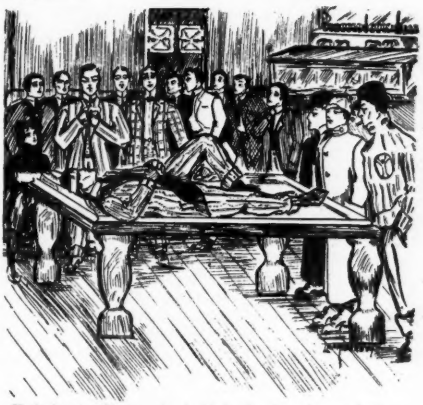
"Where did you hear this, Uncle?" I asked.

"I was within the vault when the Boss came in and as the conversation interested me, I listened until he went out of the room. It's straight, all right!"

"Thanks, Uncle, I will look out and I am under great obligations to you for the tip."

Well, I was in a pretty kettle of fish and I did not like the matter a little bit. I was compelled to go at all hours and in the worst locations, and among strangers, and at the same time must look out and see that I was not slugged or killed. I knew this Black Finnegan only too well, a loud-mouthed, hard-drinking son of Erin, who was possessed of only their hard hitting, and none of their good qualities. I knew he was the chief of the educational committee of some unions, and I had occasion a number of times to repair some mechanic who needed a primary course in union education and the work was well done. Of Finnegan proper I was unafraid, but he and his gang watching for you tirelessly week after week, and at all hours of the day and night, is apt to get on one's nerves, and I resolved to bring the thing to a focus, as I had gotten tired of walking in the middle of the street while making my night calls so I took a vacation of three days to regain my skill with my Colt revolver, and put the time in at a shooting gallery.

I was determined that either he or I should pass in their chips, and when I was satisfied that I could not miss a mark if I tried to, I took up his trail; curiously enough, in some underground way the underworld had gotten wind of the feud, and I had many watchers looking for the gang, yet I tramped night and day for three weeks and did not once get sight of the people I was looking for. I was getting more nervous and vindictive all the time and was seriously thinking of paying a visit to the superintendent of the great G. & T. Company and having the thing out with him, when the unexpected happened.



He had several large gashes in his head and one leg was broken

I had just returned to the office after a five hours' hunt for the gang when I received a message to come to a certain saloon where a man was badly injured. I forgot all about the feud and laying aside my revolver, grabbed my satchel and started. Quite a crowd had collected around the injured man who had several large gashes in his head and one leg was broken. I worked quickly and had the man in good condition, when I turned suddenly, seeing Black Finnegan grinning at me and the victim of his methods.

The sight so enraged me that without thinking I flew at his throat, and got the proper hold upon the larynx with one hand, while I gathered his head in the crack of my right elbow and took a grape-vine hitch on one leg. The onslaught was so sudden and unexpected that I had him so he simply could not injure me in the least. His attempt to shake me off resulted in both of us losing our foothold and we went to the floor with a crash while his head struck the cement flagging with a sickening thud. In-

stinctively I knew he was good for the hospital and I was just about to release him when I received a fearful kick that I later learned had fractured two ribs. I got up to face the new attack and just in time to see my patient raise up from the billiard table where he was lying and bring a cue down with a resounding crash on the head of my assailant, fracturing his skull like an egg-shell. I was carried away with a very paroxysm of rage and sprang upon the fallen man, effectually putting him beyond the power to harm anyone.

By this time I had lost all fear of consequences and seeing another member of the gang edging towards the door I sprang after him, but not in time to prevent him from escaping. The arrival of the police calmed the storm and I set to work looking over my antagonists trying to do what I could for them before they were taken to the hospital, as my professional instinct told me they would spend many a day in this institution, if they were lucky enough to keep out of the morgue, and while I was doing my best as a professional man to make them comfortable, in walked the Big Boss, who looked at me with staring eyes.

"What's up?" he asked.

"Oh, nothing, only I have just put Black Finnegan out and a member of his gang who were hired to slug me."

"Who hired them?" he asked.

"The superintendent of the great G. & T. Company," I said.

"The h— you say! Come into the back room, I want to see you for a few minutes."

When I told him what I had learned his jaws snapped like a steel trap, and stepping to the telephone he called up the telephone company and asked for a certain individual. He was asked to come to his rooms immediately with several receivers to plug in on the main line to get evidence. He told the police to shut up and take the men to the hospital and we left them and went to the office

Here the electrician skillfully placed several receivers on the telephone line and then the Boss called for the superintendent of the great G. &. T. Company at his home, and by giving an excellent imitation of Finnegan's voice he announced that he had just sent me to the hospital with a broken leg and a smashed head and wanted his money. The superintendent bit like a bass and asked for the particulars which were given by the bogus Finnegan in a drunken voice. The bait worked and he was told to come tomorrow to Dolan's saloon at 10 a. m. for his money; at this Finnegan set up a roar and insisted on getting it tonight and after trying in vain to put it off, he reluctantly agreed to come down and meet him at Schmitt's saloon.

Quick work necessary and scouts and witnesses were posted in such a way as to view the entire transaction, and one of the henchmen represented himself as a member of the gang so as to meet the superintendent with the tale that Finnegan was so drunk and ugly that the police were obliged to take him away and he was delegated to get the swag. Mr. Man was very suspicious and would not pay the money but discussed the details so fully that we had the goods on him, and I have never seen a more crestfallen man than he, when he was confronted with the evidence that might send him to the gallows. He begged like the great coward he was, for mercy, while the Big Boss promised him a term in the pen for his share in the deal, and I went home secure in the idea that at last Justice would triumph. In this I was destined to disappointment as I was only learning the A B C 's of the political game, and as I subsequently learned, it resulted in an alliance between the Big Boss and the political power of the great G. & T. Company, of course, for mutual benefit.

I thought my troubles were over and I found my fame as a pugilist had spread, and wonderful stories were told about my ability to give a good account of myself and you could have used my inflated ego as a billboard for some time afterwards, until it received an unexpected puncture. I had a visit from a short, squatty man who wanted to see me, and upon inquiring his business was told that he wanted to see the doctor who put Finnegan to sleep, and after inflating my chest somewhat I gently informed him that I was the party.

He looked surprised and then gazed more closely at me, and after walking around me, viewing me at every angle, said with disgust, "Say, Doc, honest did you use chloroform on him?"

I flared up and had a strong inclination to resent the insult when he waved his hand majestically and remarked, "Ah, forget it, don't you know me?"

"No," I answered with considerable emphasis, "and I want to remark that if you have lost any trouble you can find it here."

A smile broke out on his grave face and he handed me his card, and I knew I had the pleasure of meeting a man who had earned a world-wide reputation of a square sport. He was a fight promoter and was looking for material for a new pugulist. We had a long visit, and he asked how it was possible that I, with my build, had been able to put Finnegan out, one of the hardest hitting pugs in the country.

"Well, you know our go was not according to the Marquis of Queensbury rules," I said.

"Well, what rules did you fight on?" he asked.

"Just plain anatomical and physical rules," I said.

"I have never heard of them," he remarked.

"No, probably not, they only teach them in medical college, but they are dandies if used right. For instance I learned in the dissecting room that a pug, like any other human being, had to breathe through a very narrow slit, and I found by placing my fingers in a certain manner that the slit would disappear, and I learned that even a fighter can not fight without air in his lungs, so you see it is simple."

He looked dazed at the explanation but his respect increased considerably when I consented to demonstrate it to him. About ten seconds was sufficient to satisfy him on the point and we parted the best of friends, he telling me that I had better cut out the fighting game as I was not built for it, and that anyone with brains enough to devise such a scheme ought to have enough to live in peace with the rest of the world.

This man whom I had admired by reputation for many years said: "A man with brains should never fight. If the same amount of courage is used in facing an antagonist with the wits sharpened, they will invariably over-awe the muscle fighter and defeat him without a blow, a truism."

I later saw him demonstrate when he was surrounded with some angry pugs over one of his decisions as referee. He faced them courageously with an easy smile on his face while the pugs stormed around him without courage enough to strike.

I had been so busy with my own troubles that I had not had time to call at Aunt Mary's house for four weeks, and was considerably startled to receive an imperative demand from a girl she had taken in, to call without fail that night or I would be sorry.

The imperative call from Aunt Mary's did not find me in any too good humor, owing to the fact that I was sore in both mind and body. My broken ribs, and the escape of the superintendent from just punishment for his attempt to cause my death, put me in a frame of mind where his only safety lay in keeping out of my sight, which he had the very good sense to do by going on a vacation to the Bermudas; which was all that saved his life, and me from the serious consequences of a desperate act. I was in an ugly humor when I answered Aunt Mary's call, not having the faintest idea of the trouble, but going from a sense of duty.

I was met at the door with a whirlwind of English flung at me edgewise, the burden of which was that I was expected to remove the "nasty thing" from the house immediately, and to go with her, and to never darken the door of her house again. Even then I had no clear idea what the old lady was driving at, and was rather inclined to laugh at her earnestness, which only had the effect of turning the vials of her wrath upon my devoted head, and I listened in astonishement at hearing myself called a public brawler and a low-down public nuisance. I was stung to the quick, and I retorted hotly that she was talking through her millinery, and did not comprehend what she was saying. We had the argument back and forth, the language becoming more lurid every minute, until I eventually came to my sober senses, and began to realize that both of us were fools, and did not know what we were talking about, so I brought my fist down on the table with a bang and commanded silence, so I could grasp what was the trouble.

The evident sincerity of my attitude calmed the militant spirit of Aunt Mary, and her jaw dropped in astonishment. The woman was so stunned by my humor that she moderated her voice, and told me that Nan had been behaving shamefully, and that she was disgraced for life by her actions.

"Well, what did she do?" I asked. "Be specific."

"She insulted the minister shamefully when he happened to call while I was out."

"What did she do?" I asked.

"Oh, it is too terrible to talk about," she said.

"What minister was it?" I asked, with sudden suspicion. "How did you find out about the matter?"

"It was the Reverend Killkelly, and he told me himself. He said she was going straight to h—."

"He did, did he? Well, I'll attend to his case later. Where is Nan?" I inquired.

"She is locked in her room where she is going to stay until she repents," said the old lady, with a pious look.

"Which means that I am going to see her immediately if I have to kick the door down," I said, banging my fist down on the table with such force that she jumped. "You open the door at once. I want to get Nan's story of the outrage and I will attend to the details later."

Aunt Mary saw that I meant every word I said and meekly went upstairs, and opened the door for me and went into the room. I held the door open and told her to get out as I did not need any help. She was rather disposed to dispute my right to order her out of a room in her own house, until I reminded her that she had been paid each week for Nan's board, and that she was merely a boarder, and not a ward. She was so surprised that she went out, telling me I could believe her lies if I wanted to do so, and I was left alone with the girl. By the dim light of the night lamp I found a bundle of miserable humanity on the bed, with a tear-stained face, and disordered hair, sobbing as though her heart would break. I gathered her head on my arm and smoothed out her hair while waiting for the tempest to stop.

Presently she grew calmer and one hand crept into mine as she snuggled close to me, and after a time the storm passed and I asked, "Well, kidlets, let's have the story."

"There ain't no story," she said, pathetically.

"Well, what is all the trouble about, then," I asked.

"I don't know," replied the girl, "Aunt Mary came home today and just went for me awfully, told me I was a disgrace and that I was going straight to h—. I don't want to go to h—, Doctor," and a torrent of weeping followed.

When it calmed I remarked casually, "I think Aunt Mary's information is wrong, you are not going to that place or any other for some time, so you might just as well loosen up on the story. What have you been doing, anyway?" I asked.

"Nothing," she said.

"Well, I must see Auntie and find out what is the trouble."

The old girl rather resented my inquiries, and did not give me the facts, until I promised her I would go over and choke the information out of her pastor if she did not tell me. This threat loosened her tongue, and I found out that several days before while she was out, the pastor had called, and there was no one at home except Nan and she had said enough and done enough to disgrace her for life.

"Thanks, Auntie, Now, I will get what information I want."

So I went back to the girl's room and said severely, "Now, kidlets, you are not playing a square game

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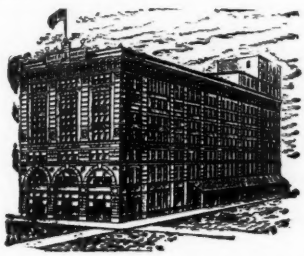

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with me. Why didn't you tell me about the minister?"

"What minister?" she said with sudden interest.

"Why, the fellow who called Monday while Aunt Mary was out."

"Oh, him," she exclaimed. "Why, what about him?"

"What did you do when he was here?"

"Oh, nothing much," she said. "I entertained him."

"Yes, so I infer, but what I want to know is how you did it. Now tell me just what was said and done while he was here."

"Well, I was going through my stunts and had my gym costume on when the bell rang. I went to the door and this man asked for Aunt Mary. I asked him to come in and sit down, as Aunt Mary said she would be back in half an hour. He called me a nice little girl and asked me what I was doing. I told him I was doing my stunts, and told him why I done them. He said he liked that work, and he would like to see me doing them, so I did the pinwheel and he clapped me, and said it was the best he ever saw. Then I worked with the rings and turned a few flip-flaps and he said he liked it, so I showed him the split, and the back-hand spring, how to walk on your hands and other things. He seemed real pleased and called me a nice girl. He showed me his watch and pulled me on his lap while he was talking; he told me stories and I liked him real well. Bimeby he asked me if I would give him a kiss, and I did, so he got to kissing me real hard and hugging me so tight I told him he mustn't, but he kept doing it worser all the time, so that I got scared. I twisted off his lap, and he tried to catch me, but I was too quick for him, and I turned a hand spring over the table, and runned upstairs, and, and—"

"Well, go on," I gently urged.

"And just couldn't help it, I gave him Elk's sign of defiance you taught me to use when people got fresh, and I runned into my room and locked the door. He called me to come, said he wouldn't hurt me, and came upstairs and begged me to come out. I didn't do it, as I got a hunch that everything was not all right, said he would get me a box of candy and give me a dollar if I would come out. I didn't do it but I went out the window on the porch and over to Schneider's house and stayed there until Aunt Mary came."

"Were you afraid," I asked.

"Well, no, but I did not like the way he looked at me."

"Well, kidlets, you are sure this is true?" I asked.

"Honest, Doctor, I never lied to you. Why should I? You are always square with me," she said earnestly,"

"Well, kidlets, go to bed. I think I can straighten out the tangle so you will not lose your happy home for a good while yet, so good night, and be a good kid until I see you again."

I was rewarded by a kiss on my hand, and I went down to see Aunt Mary. The old girl was still in a pout so I merely remarked that I would take measures to get Nan a new boarding place within a few days and went out.

The more I thought about the matter, the more my duty seemed clear. I must interview the preacher and compel him to undo the wrong, which his guilty conscience might cause him to do, and my steps turned in his direction. I was lucky in finding him in his study preparing his weekly discourse and he was rather inclined to resent the annoyance when I interrupted him. He inquired my business, and asked me to make it brief as he was very busy.

"Well, Dominie, my natural inclination is to make it very brief, but my judgment tells me that diplomacy may work out to better advantage for both of us. I am on a mission that concerns both of us, and some solution must be found tonight."

"To what do you refer?" he said icily.

"Well, it seems you told Aunt Mary that you were grossly insulted while on a visit to her house last Monday."

"So I was," snapped the minister.

"Well, it may be so, we will see later regarding the matter. Do you know that through your act you are likely to turn a motherless girl out on the streets?" I inquired.

"What I have done has been done after I have prayed to my God. I have done my duty and will do it again," he said.

"Are you quite sure it was God who answered your prayer?" I inquired softly.

"Do you mean to insult me?" he said with indignation.

"You can put any construction on what I said, that you please."

"If you do not get out of here, I will call the police," he flamed at me.

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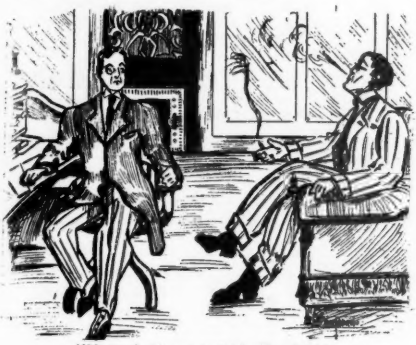
"By all means do so. It will save me the trouble later on," I said.

His face blanched, but he was game, and turned again to his sermon, as if the interview was terminated as far as he was concerned.



"Now, don't get excited, Dominie"

For my part I was well contented, as I had recognized a familiar face that I had seen under conditions which would make his hair stand, so I calmly crossed my legs and drawing a cigar from my pocket, I lit it and puffed away like a furnace.

He made a heroic attempt to ignore me, but the incongruousness of the situation had certainly gotten on his nerves, and while he was writing as if his life depended upon it, to me it was plain that his congregation would never hear that sermon.

(To be continued.)

A CHISEL FOR SPAVIN

I saw in your valuable journal a shot-gun prescription for the cure of ringbone, spavin, etc.

I would like to know if this is a joke for some inexperienced man to try on a dumb brute, or does the doctor mean to say that this will cure ringbone, but why so many ingredients? There are six, any one of which would do the trick. That is each one of these six ingredients would set up ankylosis, then why use so many? What effect would tartar emetic have on the skin or bone? Euphorbium is about the only thing that will blister the hide of an ox. Why not use cotton seed oil in place of oil of wormwood, one costs $2.25 for four ounces, and the other costs about five cents for same amount and would have the same effect in combination with the other ingredients. There is enough croton oil to poison the animal by absorption, but is good in a

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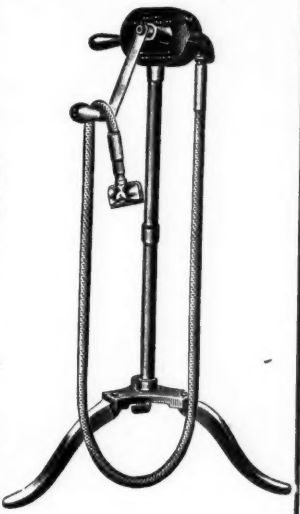

Chicago Flexible Shaft Co., 602 La Salle Avenue, Chicago

blister. Oil of turpentine is very painful applied to the skin of the horse.

In my opinion, sulphuric acid alone will do as much as the whole prescription combined,that is it will eat into this bony foundation as quick as anything and remove the lump. I have good success in treating the lameness of ringbone, spavin, etc., but cannot remove the bunch and the only way to remove this is with a chisel and hammer, but it is as well to wait until the horse is dead before applying this course of treatment.

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[Comment unnecessary.—ED.]

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Treatment. The hair was shaved over the entire area a hot antiphlogistine pack applied and bandaged on, and the horse put at absolute rest. This pack was removed in twelve hours and another applied. The second pack was removed in twelve hours, when swelling had disappeared and lameness subsided. The horse was at work again in forty-eight hours.

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